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VOLUME THREE

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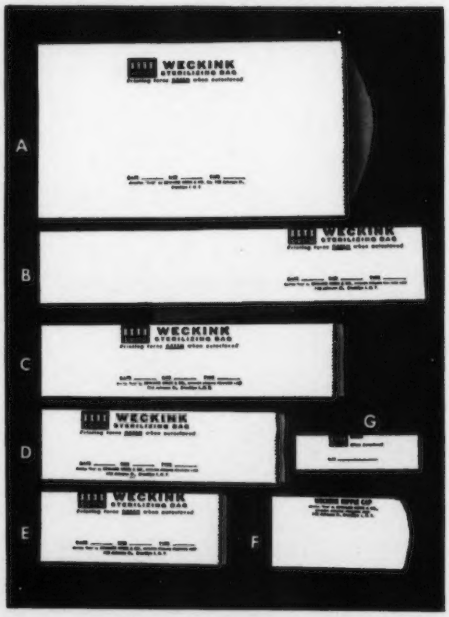

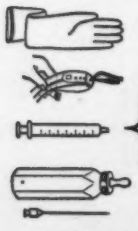

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from

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Volume Three

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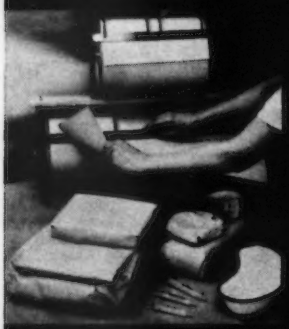

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Foreword

THIS is the third CENTRAL SUPPLY YEARBOOK. Like its predecessors, it brings together in permanent reference form selected material from the monthly central supply department in HOSPITAL TOPICS magazine.

HOSPITAL TOPICS was the first hospital publication to recognize the growing importance of the central supply department by establishing a special section in the magazine for central supply personnel. Since 1952, the department has presented practical articles which inform readers on new developments in the field and give them ideas on how to improve the quality and efficiency of their operation.

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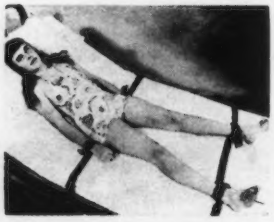

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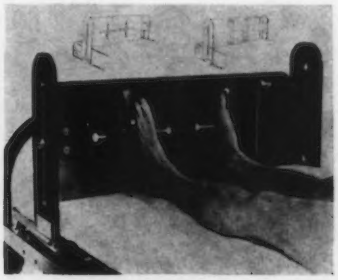

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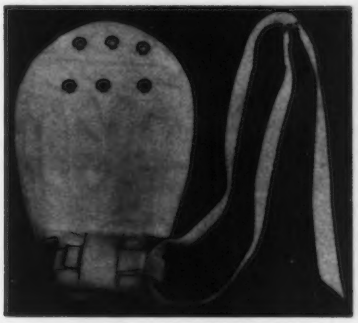

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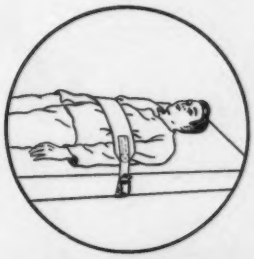

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Contents

Nurse Plays Vital Role in Efficient C.S.R. Function 9
Carl W. Walter, M.D.

How Our Laundry Washes, Wraps Gloves and Surgical Packs 18
Charles B. Cook

Set-Up Trays Designed for Efficiency, Eye Appeal, Handling Ease 22

Booklet Reviews Literature On Preventing Cross-Infection 25

Small Area Provides Efficient Storage of Fracture Equipment 28

Sterilization of Cystoscopy Instruments and Accessories 31
Leo Cravitz, Dr. P.H., and Virginia R. Tyler, R.N.

An Ex-Supervisor Speaks: on Why a Nurse Should Head CSR . . . on "Status Problems" . . . on The Challenge of Central Service 36
An interview with Mrs. Betsey R. Carroll, R.N.

Our Trash Problems Are In The Bag—— 41
L. Brent Goates

CSR Planners Review Efficiency of Department They Designed . . 44
Frederick E. Markus, Jean E. Christie, R.N., and Evelyn Trabach, R.N.

Thermo Plastics In Patient Care Devices 49
William P. Murphy, Jr., M.D.

Our "O. and O." Department Solves A Problem 53
R. J. Maifeld

How To Care For Stainless Steel Equipment 56
Richard E. Paret

A Simple Siphon For Initiating Gastric Drainage 58
M. Michael Eisenberg, M.D.

Streamlined Setup at Indianapolis General Helps Cut Equipment, Manpower Costs 59
Ellen L. Davis

Central Supply—Nerve Center of the Community Hospital 63
John H. Gorby

Talks on Disposables Featured On Tri-State CSR Program 67

Outline For Study To Find Glove Costs 68

Hospital Study Favors Disposable Syringe Units 70
George N. Johnson

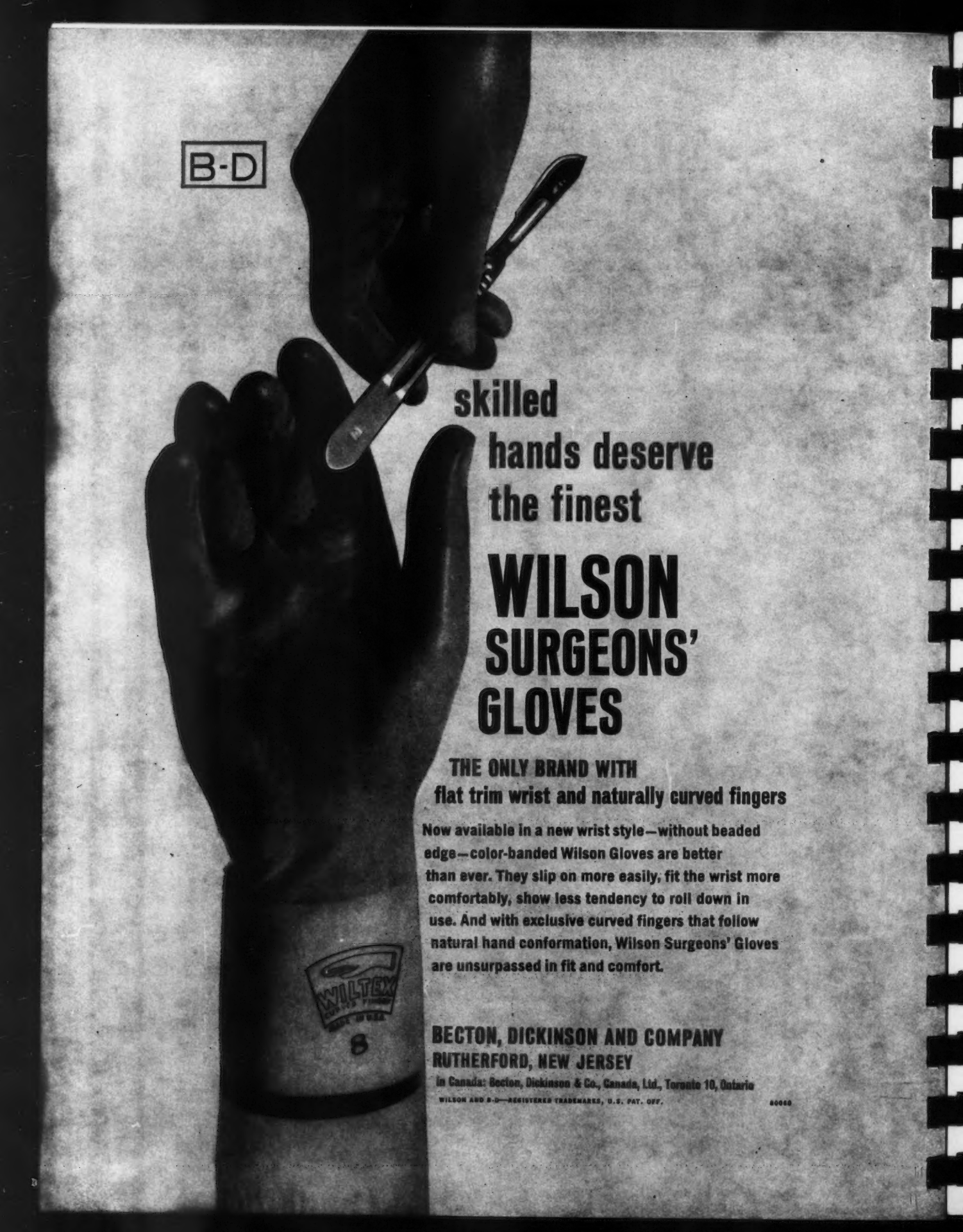
New Surgical Dressing Technic Helps Hahnemann Combat Staph. 75
Cecilia D. Yastremski, R.N.

Portable Supply Carts Aid to Efficiency 77

Boston's Busiest . . . Peter Bent Brigham's Central Supply Services Operating Rooms, Wards, Research Areas, Physicians' Offices . . 80

This CSR Reports to the Administration 85

Index 89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Nurse Plays Vital Role In Efficient C.S.R. Function

By Carl W. Walter, M.D.*

• To characterize the nurse's role in the central supply room, we must first describe the C.S.R. as it relates to the patient, the doctor, the nurse and the hospital. Why have a C.S.R.? How does it operate? What does it do? Who does it? When is success achieved?

Let us examine the function of the department and highlight the role of the nurse both as part of the C.S.R. function and in relation to the patient's needs.

Central supply rooms are becoming an increasingly controversial subject in hospitals. Many hospitals feel that the department is a burden rather than a help. This feeling stems from the fact that too often the idea of a C.S.R. is promoted as a "survey service" for hospitals. Planning is accomplished by an enthusiastic salesman who understands very little about the care of the patient. His determination of the need for a C.S.R. is related to the potential size of sale he can make to the hospital.

(L. to r.): Mrs. D. Tressider, ORS, Highland Hospital, Shreveport, La., Dr. Walter, Minnie Armstrong, central service supervisor, Hermann Hospital, Houston, Tex., and Clovis K. Todd, assistant ORS, Kennedy VA Medical Teaching Group, Memphis, Tenn., discuss the nurse and central supply.

Acres of stainless steel and lots of fancy equipment located in little rooms or cubicles have little relation to the need of the hospital, doctor, nurse, or patient. A picture of the completed C.S.R. in a hospital magazine or in the Sunday section of the local paper looks like efficiency itself.

Then the hospital puts the room into use and nothing happens. Improvisation begins. Shelves are removed. Rearrangement is a daily chore. Expensive equipment disappears under drapes. Bicycles are stored in a corner of the room. Finally, after a year of disillusionment, the hard core of what the C.S.R. contributes to patient care in that particular hospital can be defined.

A creative C.S.R. is planned differently. First, the management of the hospital calls on the medical staff to define the need and potential advantages of a C.S.R. in that particular hospital.

The greatest advantage is the standardization of equipment for doctors, nurses, and ancillary services throughout the hospital. This is difficult to achieve even in a tightly-organized hospital, but almost impossible to attain in the voluntary association of individuals that characterizes many hospitals.

Another big advantage is the opportunity to exploit skilled help for getting out supplies. In the course of a year or two, these people acquire experience, and a team results that can put up supplies, make solutions, and care for instruments superbly well, efficiently, and economically.

The doctor knows that any package he opens will be pretty much the same as the last; the sigmoidoscope will always work; the knife will always be sharp; the connector in the oxygen equipment will always be in the kit, and the dozens of frustrations related to inefficient supplies will disappear.

Standardization of technics and generally improved methods of patient care throughout the hospital can be realized from good C.S.R. function. Technics become increasingly important as administration becomes more concerned with new occupational hazards of hospital employment. The hazard of working with infectious diseases such as polio or tuberculosis has always been recognized, but the daily worker's occupational hazard has escaped notice.

Homologous serum jaundice among workers who pricked their fingers on broken syringes or soiled needles focused attention on the need for protection of such workers. The development of nitrogen-mustard therapy brought with it the problem of blisters in personnel processing the used equipment. Antibiotic sensitivity and dermatitis in many nurses and supply room workers emphasized the hazards of handling contaminated material.

More recently, staphylococcal sepsis has been causing disability among hospital employees to the extent that it is now recognized

*Dr. Walter is associate clinical professor of surgery, Harvard Medical School, and a surgeon at Peter Bent Brigham Hospital, Boston. This article is based on a talk given at the special session for central service nurses during the sixth national congress, Association of Operating Room Nurses, Houston, Tex., February 9-12, 1959.

by the workmen's compensation laws in parts of Canada, and personnel who have acquired these infections at work and who are forced to leave their jobs are compensated. The growing cognizance of the hazards of hospital employment is another reason for installation of a C.S.R. where good technics can be evolved to protect workers as well as patients.

The C.S.R. permits the use of time and labor-saving equipment. In a good supply room, one large sterilizer will be installed to process a dozen or more loads a day. This is a big saving in purchase and maintenance costs for hospitals, and decidedly more efficient than the custom of installing sterilizers behind every door in every utility room throughout the nursing units.

Automatic processing equipment can be purchased for C.S.R. use which will save time and standardize technics. This kind of equipment is impractical if the work of sterilization is scattered throughout a hospital.

Central supply room activities should be studied from an industrial engineering point of view. It is often surprising to learn that the least expensive employee is the dollar. Industry discovered this many years ago. It costs only 10 cents a day to hire $100 to work for a year, and this $100 capital investment replenishes itself during the three-year expected life of processing equipment.

Strangely, though, this concept is not understood by most hospital managers and planners who try to keep capital expenses low. In industry, it is not unusual to spend between $35,000 and $40,000 on capital equipment per worker to make him productive. It usually takes about $4,000 to $5,000 capital investment to make a $1.50 an hour worker economically effective in tasks comparable to those found in the central supply room.

A C.S.R. makes it possible to control the quality and inventory of supplies and equipment in a hospital. With centralized responsibility, costs can be determined. Methods can be studied and work programs developed. It is impossible for the night nurse or relief nurse to incorporate efficiency in her work as she tries to fill idle moments by making supplies.

Central supply rooms in most hospitals fail largely because they are grafted onto an existing hospital organization such as nursing service. Central supply room operation is an administrative function of the hospital and should be the responsibility of an almost unique individual who has knowledge of business methods as well as nursing. It has little to do directly with nursing.

It is a very expensive department and should be under the supervision of an individual who understands patient problems and technics, nurses, doctors, administrative problems, and personnel problems. The individual requires education in nursing, administrative insight and respect for administration's methods, and a knowledge of people and things. This characterizes the background of the nurse's contribution to the central supply department.

A good C.S.R. supervisor must also have the personality to provide the leadership necessary to organize a functioning team that will extend to the bedside and help care for the patient with superbly p l a n n e d and arranged equipment and supplies. This is the prime role of the C.S.R. supervisor and the "why" of her being a nurse.

The C.S.R. concept must be accepted as an administrative responsibility and challenge. Professional supervision is essential to coordinate needs of the professional staff and the operation of the department.

The key to coordination is a current practice committee or a technic committee, established by the staff of the hospital to study the clinical needs and formulate and describe recommendations for technics and supplies. This committee should be composed of representatives of medicine, surgery, obstetrics, laboratories, outpatient department, administration, nursing service, etc., so that any clinical problem can be presented, defined, studied and a technic established. The technics must be written out and published so that they are available to everyone working in the hospital. Practical methods for accomplishing these technics must be elaborated to guide the C.S.R. Purchasing specifications must be written so that the purchasing agent buys exactly what is needed, and the absurd situation of the doctor wanting one kind of instrument and getting another is avoided.

The C.S.R. supervisor, under the technics committee, must arrange periodic teaching programs to familiarize hospital personnel with supplies that are available and to teach their use, making it inexcusable for anyone to claim ignorance of a new practice.

After the current practice committee has functioned for a while and personalities have meshed together and identified with the main cause of bringing better equipment and care into being, the committee is able to define common practices for staff members. After a problem has been studied and its complexities realized, the doctors on the committee are usually ready to settle on a fixed technic, and it is no longer necessary to provide five different trays for catheterizing the female bladder, for example, or 16 separate ways of providing suction.

These problems are thrashed out at the committee level; answers are based on the modern concepts of therapeutic needs of patients, and everybody learns to go along with the decision of the majority. The work of the supply room is made easier, and the resulting standardization benefits doctor and patient.

An understanding must be built into the committee that anyone in the hospital has a right to present a problem, discuss improvement, and request change. This provides a built-in guarantee that standardization will not be rigid and technics will be modernized continually.

A steady stream of young people in and out of the C.S.R. and the current practice committee will keep attitudes progressive. As peo-

ple first get into hospital activity, they are more receptive to change and more interested in the hospital's general program, whereas an oldster gets busy with patients, has fixed ideas, and feels that what was good "years ago" should be good this year.

The surgeon who works as a chief of staff on elective procedures beginning at 9:30 every morning is no man to decide how many supplies are needed in the emergency room, because he is always elsewhere on Saturday night, and seldom sees emergency cases. The young people who are actively prowling through the hospital on off hours are the ones who know such problems best.

The current practice committee may be impotent if it is not built into the over-all organization of the hospital and given proper authority. To work well, the committee should organize bulletins describing procedures and submit these to the hospital's executive committee for discussion and approval. The bulletins should be made part of the minutes of the executive committee meeting. In this way, each technic gains in stature and becomes an authoritative document which can be enforced throughout the institution.

This general approach has worked well and solves the problem of the cantankerous physician who persists in the technics of his internship of 40 years past. He can only bow to the decision of the majority when confronted with a technic backed by recognized authority.

A current practice committee such as the one I have described becomes the forum for expression of opinions on patient care. Because it talks about "technics" and not "patients," animosity is averted. Freedom of expression and interest are encouraged, and because the group is charged with what might be called the flavor or character of hospital service, it listens to new ideas more readily than if progress depended upon the diffusion of information into an aging staff, fixed in its ways, with no real stimulus for re-evaluating familiar technics or getting together new and more advantageous ones.

Economy for the patient can be realized when a committee thinks creatively. One kind of committee may thrash about for many months to perfect a technic which will take the syringe and needle to the bedside and have the doctor disassemble the used unit, putting the needle in one pan of solution and the syringe in another. This committee successfully evolves a technic wherein no one handles the used equipment until it has been washed by machine and terminally sterilized in heat.

But another more creative committee may think beyond an obvious solution such as this and discover a brand of disposable syringe so well-designed that one syringe can be assigned to a patient for eight or 10 uses a day. The expense of disposable syringes is thus cut from 15c per injection to 2c an injection.

A technic committee with this kind of vision might get together with a manufacturer and bring out a syringe so cleverly designed that bacteriological contamination is unlikely, even though the syringe is used many times. It may be a syringe which can be safely stored in the patient's bedside table without danger of contamination, and which doesn't stick or leak.

A technic is improved, an occupational hazard is eliminated, and the cost of injection is cut. This is the kind of committee that brings improved technic and economy to patients everywhere.

The latter committee works well because it has a broad idea of what it is trying to accomplish, and knows enough to solicit professional cooperation within the hospital and industrial cooperation from outside the hospital, particularly from designers and engineers who can solve problems that have been defined by a professional group.

If I were a nurse considering employment as a C.S.R. supervisor, I would try very hard to find out how well the current practice committee in the hospital worked. If one didn't exist, I would explore the possibilities of organizing one, and determine who would work on it. The most stimulating part of C.S.R. work lies in the nurse's role in influencing patient care through such committee action.

Some liaison must exist between the committee that establishes the rules of the game and the living hospital organization that sees that they are adequate and obeyed. This is the role of the C.S.R. supervisor. She must have the understanding and breadth of contact to do the job.

It takes a mature individual of many talents and attributes not common to the average nurse to accomplish this. She must be liaison officer between her department and the critical situation as it occurs. This is difficult, because when the patient is bleeding or has cardiac arrest or requires resuscitation, it is always the patient's problem that is paramount.

No matter what the problems in her department, the supervisor must subordinate all her frustrations and give service promptly, and later find out why routines failed. This is a human characteristic difficult to find. As we mature, we tend to be fixed in our ways and defensive rather than forward-looking with an aggressive attitude toward "service first" and "let's discuss failures later."

Here again, an ingenious, alert nurse can often bring order out of chaos in an unpredicted patient situation. I say unpredicted, because no matter how well we plan for patients, every new admission is a new and potentially unique problem.

Another facet of central supply room function is concerned with the major hospital expense created by theft—"toting," if you like. Many hospitals with big deficits would be very surprised to learn how the deficit disappears once thievery is controlled. Every once in a while, the police in a community raid a drug ring's headquarters and find thousands of dollars worth of drugs and syringes which have been stolen from the local hospital.

The immensity of this problem is seldom appreciated. An efficient C.S.R. can define and attract administrative attention to the problem within the hospital. The nurse in the supply room must be able to enforce a security program that

View of floor cart developed at the U. S. Public Health Service Hospital, New Orleans.

prevents thievery and loss of supplies and yet, paradoxically, she must also make supplies available everywhere throughout the hospital at a moment's notice.

This is hard to accomplish, and success depends on knowing the habits of the nurse, the doctor, and the orderly. A good C.S.R. supervisor can save the hospital many times her salary by preventing this type of dissipation of hospital assets.

The "how" of C.S.R. operation is important because it concerns the institution as well as the activities of the supply room itself. A work-simplification program should be part of the department's function, under the direction of a supervisor who knows enough about work-simplification technics to put them to work in the best interest of the patient. In many hospitals, the whole work-simplification program stems from and is based in the central supply room.

Another problem in the "how" category is distribution of supplies. The dumb-waiter is popular in many hospitals, but I think the genius of its inventor was at its height when he named it. I do not believe that dumb-waiters contribute much to central supply room function except to accommodate the laggard and the person who doesn't plan his work well and who does everything on the basis of crisis.

A realistic distribution system maintains the C.S.R. inventory at the point of use on a supply truck. This truck can be five feet long by two feet wide by five feet high, with a number of shelves for supplies and a couple of bins at the bottom to catch odds and ends of used equipment.

Supply room function should envision delivering freshly stocked trucks each morning to the nursing stations. The trucks are a kind of extension of the supply room. Throughout the day, used equipment is put back in the bins. Next morning, a replenished truck is exchanged for the depleted one. On a busy ward this exchange may be made twice a day.

When the truck is returned to the supply room, it is very easy to take an inventory to determine what has been used. This gives management control of supplies because it provides a daily check on all equipment that has been returned, stolen, or lost in a given area. Discrepancies in count give an idea of what is borrowed, and gradually enough knowledge accumulates to distinguish the responsible from the irresponsible ward. The needs of individual wards can be predicted, and inventory can be adjusted so that the situation is a realistic one.

The inventory on the truck should be tailored to fit the needs of the individual patient or laboratory area that it serves. Usually, trucks for the operating rooms, the nursery, delivery room, and emergency rooms can be replenished with a standard inventory developed by experience. At the end of the day, there should be little finished inventory on the shelves in the C.S.R. Storage facilities should be for materials and work in progress.

When supplies are stored at the point of use, there are several indirect advantages, not immediately appreciated.

(1) The hoarding instinct of nurses is discouraged. When supply-room service is inadequate and nurses are caught short of supplies, they hide supplies in linen closets and drawers. These supplies become useless and shopworn, and quite often disappear as a transient worker discovers the hoard and carries it off.

(2) Truck distribution also eliminates the emergency that occurs at 2 a.m., particularly on Sundays. The telephoning, the running, the hunting, incidental to finding something in the supply room or someone to find that something, take so much time that when the item is located, the need is past.

The activity and the success of the C.S.R. are seldom measured in the proper focus. Success during standard working hours is not an impressive index. Success should be measured in the wee small hours or at the end of a long holiday weekend. This is when one can truly evaluate the success of planning. That extra carful of accident victims in the emergency room at the end of the holiday weekend can raise chaos in many hospitals, or can be handled with efficiency and ease, depending on the success of the supply room's planning.

Few trustees or administrators recognize that they do not administrate one hospital; there are four or five hospitals in every structure. They think chiefly of the one that works from 8 in the morning to 3 in the afternoon. This is the hospital with two, three, or four people to care for every patient. Things work smoothly, and few problems are present.

The second hospital works be-

tween 3 in the afternoon and 11 in the evening. This is the anxious hospital in which there are just enough people to do the routine jobs, but any extra burden causes trouble.

The third hospital works from 11 in the evening to 8 in the morning, and here things are really skimpy. There are just enough people to barely care for the patients, and these people are sleepy. This is the time when things can really get frantic — when there is one employee for as many as 15 or 20 patients. This is the hospital the C.S.R. can help most, because that one person has no time to hunt supplies.

The number four hospital is becoming increasingly popular in this country. This is the Saturday, Sunday, and holiday institution that behaves as though illness were planned. The rate of personnel to patients may be 1 to 30. Because holidays have a way of coming with weekends, supplies get very low. Operation crisis takes over.

From my point of view, the success of the central supply room is measured at a moment late at night or after a holiday weekend, when the only person on a nursing unit can go to the truck and find exactly what she needs. A vague measurement, perhaps, but one that is perfectly possible if the nurse in charge of C.S.R. has recorded inventory for many weeks and accumulated a record of what is needed to keep this nurse working efficiently.

An operation seldom considered in C.S.R. operation is how to pick up charges. Most supply rooms flounder in a mess of red tape and paper requisitions, because hospitals have not thought clearly about what it costs to keep operating. The C.S.R. can help the hospital improve cost-accounting systems.

Most industries use a travel-ticket system. The costs of material and labor are recorded on processing tickets that accompany the blueprint and the route sheets as raw materials are converted to finished products. The materials, the parts, the machine time, and the labor are recorded as the work is done, and detailed cost experience accumulates.

This kind of travel ticket exists in every hospital. The blueprint for the care of the patient is the doctor's order sheet. In a well-run hospital, nothing is done for a patient without a written order. If this sheet were reorganized just a little, nursing service records, requisitions for laboratory work, charges for the business office, and requisitions for the supply room could all be obtained in one operation.

With such a system, a detailed breakdown of hospitalization costs could be given any patient making the request — a virtual impossibility in most hospitals today.

The multiparous system of bookkeeping, for example, provides collated forms that can be indexed over a master sheet — the doctor's order sheet. Writing the order simultaneously yields copies that function to initiate the order, requisition supplies, and indicate a charge.

The next thing to investigate in the C.S.R. is "what" to do. Some supply rooms are gigantic storerooms dispensing disposable supplies. Other supply rooms are departments for manufacturing solutions, supplies, and kits.

In some rooms, the number of items processed is limited to those intended for specific patient therapy. In others, supplies are merely provided for the operating room, delivery room, outpatient and emergency wards.

What is done in the C.S.R. depends largely upon the size of the hospital and its ability to determine when it is economically wise to make supplies and when they should be purchased. It also has to do somewhat with the kind of hospital. The hospital caring for the problems of tomorrow's medicine, for example, will be making solutions that are not available commercially.

The extent of C.S.R. service depends upon the basic purpose of the hospital and the vigor of the current practice committee.

Hospitals all have the problem of food service, and I do not believe any hospital would think seriously of putting food service in the C.S.R. Yet, in many hospitals, infant formula is made in the supply room, and this function goes on conveniently and efficiently because there is a nurse in charge who understands the over-all philosophy of asepsis and the need for it in this particular operation.

Housekeeping service in most hospitals is largely a matter of clean floors, beds, walls, and furniture. Occasionally a communicable disease necessitates terminal disinfection of the facilities, furniture, and bedding. Increasingly high occupancy rates make it essential to provide clean furniture, bedding, and equipment instantly.

To save some of the time it takes the housekeeping department to do all this on the nursing unit, many hospitals assign some aspects of terminal cleaning to the central supply department. The C.S.R. may sterilize mattresses, pillows, and blankets for the whole hospital. Furniture may be brought to the department on a truck for steam cleaning, and a clean truckful returned so that the room is ready for use almost immediately.

Supply rooms and the things they do vary enormously, depending on how convinced the current practice committee or administrator is of the efficient way of getting jobs accomplished.

The last consideration in this discussion of central supply room planning is usually the first — "where" to locate the supply room. Any well-organized supply room, particularly one clinically oriented through a nurse supervisor and well integrated with hospital service, will grow. The growth becomes rather phenomenal as the scope of what the supply room can do for the doctor, nurse, and patient is appreciated.

The biggest consideration in location should be expansibility. The second should be distribution. If trucks are used, the location is secondary as long as there is a good corridor for access to the patient-care areas. Dependence on dumb-waiters for distribution obviously limits the location of the supply room to the area of the shaft and, because the shaft is centrally located, expansibility must be sacrificed.

Central supply rooms need not be located in high traffic areas. Ac-

cess can be limited because the C.S.R. need seldom be visited. Activity flows outward, and the supplies are dispensed in patient-care areas. The fewer people coming to a supply room, the better it functions.

Another consideration is storage of raw materials. These are usually in cartons not suitable for storage in working areas, and storage must be in a cool, dry, vermin-free place.

In many hospitals, the central supply room is charged with the care of critical equipment, such as splints, suspension frames, Foster beds, respirators, oxygen equipment, etc., and another type of processing and storage space is involved.

The respirator in the average hospital is used about once in two years, but when it is needed, it is needed in a hurry. It must be clean and in good operating condition. It will not be if it has been stored in the basement with janitor and housekeeping supplies, or if it has not been run periodically. This type of equipment must be checked periodically and kept in condition for instant service by a person with insight into its use.

Another consideration in planning a supply room is "who" is going to work in the supply room. I have tried to demonstrate the talents essential for a supervisor. A mature, institution-wise nurse with a realistic attitude toward personnel makes a good C.S.R. supervisor. I do not believe, however, that more than one such person is needed in the department. She should be paid well, and given a spot in the organization chart of the hospital so that she can do her job efficiently and with recognition.

As for other personnel in the supply room, there are few requirements for these. People who are congenitally neat and clean and who have mechanical aptitude should be chosen. Many of these become interested in their jobs, and make lifelong careers of them. Visits to many supply rooms have convinced me that if superior personnel are chosen initially, they are likely to stay for years and do good jobs without much difficulty.

Youngsters who move around a lot, who are looking for glamorous careers, who are in love every other day, are very poor supply room workers. Nurses assigned to C.S.R. often are failures because they feel the work is beneath their professional dignity. They are often defensive, have no enthusiasm for the job, and usually waste their time griping rather than working. We have had poor experience with volunteers. They are uncontrollable. Their behavior is erratic, and there is always a crisis at home to prevent their coming to work on the days they are needed most.

A hospital serving 200 patients or more needs 24-hour coverage in the supply room. Even though supplies are stored at the point of use, there are unanticipated emergencies. These bring doctors and nurses to rummage through the supply room looking for something which is more often than not already on the ward. This can be dangerous. Inventory is pawed over and disarranged. Time is wasted. Lack of coverage in the supply room for emergencies begins endless disputes, and the department inevitably falls into disrepute.

Routine chores requiring a known amount of time can be assigned to a night shift. Syringe-washing, glove-washing and drying, and the like, can be standardized. Loafing and wasting of time can be prevented simply by assigning a known quantity of these tasks to night or holiday workers. Usually dispensing supplies for emergencies does not interfere with productivity.

The final thing to consider in planning a C.S.R. is the floor plan. This should involve a very simple layout, keeping the functions around the nurse supervisor so that she is in touch with everything. Unsterile processing operations should be located together and sterile finished supplies in another area.

Aisles should be wide. Equipment should be fastened to the floor only at the periphery of the room. Tables and processing equipment should be on casters to allow movement into working areas as needed. Bins and storage areas should be at a minimum, because the supply room is a functioning area that changes with the nature of the work.

One concept of a supply room features the supervisor's desk built into the center and the functional areas lined up around the periphery. The supervisor is responsible for sterilization, and the storage area is used largely for replenishing trucks which are taken to the wards. All this can be done in many ways; this one illustrates the ideology of designing a supply room about the supervisor.

A static supply room with everybody satisfied with things as they are is a sign of a nonfunctioning current practice committee. The job may appear to be done, but, at the rate medicine is progressing, the job is never done. Competent lay personnel may work at established chores with apparent efficiency, but the nurse supervisor will always be needed to maintain the liaison with the medicine of tomorrow by talking with the doctors and keeping up with progress.

Discussion

Q. Is the ethylene oxide sterilizer ready for central supply room use, and are there any means of proving the articles have been sterilized in these units?

A. The ethylene oxide sterilizer is useful for two kinds of equipment: (1) items that are destroyed by exposure to moist heat and (2) items that are too big for the conventional dressing sterilizer.

In the first class, there are all the plastic prosthetic devices, endoscopic instruments, and certain chemicals that are best sterilized by ethylene oxide. Small ethylene-oxide sterilizers for cystoscopes are a good addition to a supply room.

For mattresses, furniture, incubators, Isolettes, and anesthesia equipment, a large ethylene oxide sterilizer is very useful. I do not believe that ethylene oxide is a reliable process for sterilizing the large bulk of hospital supplies. The process is erratic and tricky

and does not lend itself economically to routine sterilization of heat-stable supplies. Steam is readily available, much more reliable, easily supervised, and more economical.

Ethylene oxide sterilizers can be monitored with cultures just as steam sterilizers can be. Small sachets of chemical are available which when placed in the sterilizer turn color when exposed to the proper concentration of ethylene oxide for the proper time.

Q. What do you think about pharmacy taking over central service?

A. Pharmacists can take over central supply rooms in many hospitals perfectly well, just as nurses can take over the pharmacy function in many hospitals. It depends on the philosophy of the hospital; its size; the kind of patient it serves. It also depends on the personality of the pharmacist or nurse and his or her qualifications for either job.

There is no hard and fast rule to be applied. Hospitals have used pharmacists as central supply supervisors with success and efficiency because most pharmacists have a good hard core of business sense. This is a big asset they bring to the care of the patient.

On the other hand, many pharmacists are often intrigued with the glamor of medicine and have "disappointed doctor" complexes which complicate their concepts of patient care.

If you recognize that the C.S.R. should be dedicated to serving the doctor and patient, I think you will see immediately that the nurse in most hospitals has an enormous advantage if she is a particular kind of nurse with a broad-gauge point of view on patients, doctors, hospitals, and people. A person interested only in earning a living and having no interest in over-all hospital problems will be a sure failure.

Q. How often should sterile packs be re-autoclaved?

A. A properly packaged, wrapped, sterilized package can be kept indefinitely if stored in a clean, dry, vermin-free spot. If a package is not likely to be used for a long time, it is wrapped in a sheet of polyethylene to protect it against accumulations of dust, dirt, and moisture.

Q. Can surgical scissors be autoclaved?

A. Good stainless steel surgical scissors can be autoclaved without deterioration. I know of no way of sterilizing a cheap pair of scissors without destruction.

Q. Is there any solution you recommend for cold sterilization?

A. The whole problem of cold sterilization of instruments is a complex one. The answer depends upon what you mean by sterilization, and upon your understanding of the hazards of hepatitis.

There is very little evidence that any chemical will destroy the virus of homologous serum jaundice in a positive sense. Other viruses have been studied. Chemicals will destroy some of these, and many persons assume that the virus of homologous serum jaundice will be destroyed by the same process, but the proof can only be found in human volunteers. To date, this research has not been completed.

My own philosophy is one of a positive approach. Get rid of

Shown with Dr. Walter after his talk are some of Houston nurses attending. Seated (l. to r.): Mrs. Lola Smith, St. Luke's-Texas Children's Hospitals; Mrs. Patricia Manley, Medical Arts Hospital; Hazel Kramer, Memorial Hospital; Gertrude Parrish, St. Joseph's Hospital; Maggie Batson, Memorial Hospital; Sister M. Teresita and Sister Michael Joseph, St. Joseph's Hospital; and Lee Bowman McCulley, Hermann Hospital.

Standing (l. to r.): Dr. Walter; Mrs. Minnie M. Armstrong, Hermann Hospital; Mrs. Eleanor Cupit, Heights Hospital; Margaret Bourdon, VA Hospital; and Mrs. Elda Kleinfelder, St. Joseph's Hospital.

sterilizing technics which are time-consuming and only compromises, and heat-sterilize everything.

Q. How long after a patient leaves the hospital is the hospital responsible for staphylococcal infection?

A. The more we learn about the staphylococcus, the more we recognize that once a patient or an individual has been in a hospital or worked in a hospital and acquired the staphylococcus, he is quite likely to develop serious difficulties for years afterward. The responsibility, biologically at least, never ends. Morally, our position should be the same, and until it is, I do not think we will change our behavior or correct our practices to a point of progress in combatting the problem.

Q. What is your opinion of a formaldehyde cabinet for sterilizing urological instruments?

A. It has been known for many years that dry formaldehyde gas is not a germicide. Moisture must be present to make formaldehyde effective as a germicide. This implies a much more sophisticated type of sterilizer than the usual box with the little heating coil and paraform tablet.

On the other hand, a formaldehyde sterilizer for sterilizing mattresses or bulk supplies or furniture is a very useful device. But a vacuum must be drawn, and the relative humidity in the sterilizer must be 80 percent. This is accomplished by introducing steam and then sufficient formaldehyde gas. The load is kept at 26°C. for 30 minutes or an hour.

The disadvantage is that formaldehyde condenses on the material being sterilized and forms paraform, which unfortunately causes sensitivity rashes in some persons. This disadvantage has limited the widespread use of formaldehyde gas as a good processing agent for bulk hospital supplies. Ethylene oxide does not produce this kind of sensitization in people, and promises to supplant formalin.

Q. How do you feel about using the same personnel in the supply room and the operating room as a combined department?

A. This is a matter of hospital size. In a 25-bed hospital, it is ridiculous to have a separate supply room. It is equally ridiculous to put the central supply room of a 600-bed hospital in the operating room. The answer depends on how the hospital is designed, and the size and the kind of people employed. Many compromises are possible in the small institutions because closer supervision is feasible.

Q. How should syringes be dispensed to the floors—in one large container, or in individual paper envelopes?

A. Here again, the answer depends on your basic philosophy and the kind of syringe used. I think every patient should have an individually wrapped or individually processed sterile item every time.

When cans or bulk containers are used for packaging, contamination is inevitable, because people are people, and they do not remember that when the lid is off the container and they speak across the top, asking "how many" or "where shall I put it," they spit into the container and end the sterility of the contents.

Q. What is the terminal care of a room following a communicable disease? Is spraying a room and closing it effective?

A. The answer varies with the kind of room involved. Rooms are not difficult to disinfect. The easiest way is to spray the walls, sills, tops of cabinets, and so forth, with a detergent germicide, using an ordinary garden-type of sprayer, and then simply wipe the walls down to the floor with a rubber squeegee, such as is used for cleaning windows.

You then spill 10 or 12 liters of the same detergent germicide on the floor, push it around with a cellulose mop head, and pick up the flood with a wet pick-up vacuum cleaner. It is an advantage to choose an agent that leaves a germicidally active film on the surface. This quick and inexpensive method leaves the room 100 percent clean and ready for reoccupancy.

I think beds should go through a steam jet for cleaning; mattresses, pillows, and blankets through an ethylene oxide sterilizer. If blankets are soiled, they should be laundered.

Q. Discuss the use of plastics as coverings for such emergency packs as cardiac resuscitation trays, tracheotomy trays, and the like, to reduce the need for resterilization.

A. As mentioned previously, the sterilized tray is simply wrapped in a sheet of polyethylene or placed in a polyethylene envelope and sealed. Another very interesting use for this kind of wrapping is protection of resuscitation trucks. These trucks are usually equipped with emergency drugs, tracheotomy sets, cardiac resuscitation sets, resuscitation equipment —all expensive, all getting dirty, and all being stolen. When supplies are needed, they are missing or not usable.

We heat-sealed the truck in a big sheet of polyethylene. Certain interesting facts became evident: (1) the trucks are not used very often; (2) when they are, it is simple to tear the plastic off, and the supplies and equipment are always clean and ready for use.

Thievery from the trucks has been thwarted, and they are now true emergency equipment. Heretofore, it has been simple for persons to grab a syringe from a convenient truck rather than walk 12 feet to a routine source. Packaging a whole truck, except for casters, in polyethylene has proved a great time-saver and made life-saving equipment available for emergencies.

Oxygen therapy equipment is the sort of thing people are likely to tinker with in idle moments. This equipment can be kept in good order in much the same way. The plastic cover prevents idle tampering and keeps the equipment clean. A piece of plastic, 9′ x 12′, costs about 50 cents; a heat sealer about $3 or $4. Packaged this way, bits of equipment might stand for years and still be ready for use when needed.

Q. How long should gloves be

sterilized?

A. People who study the sterilization of rubber gloves come to realize that the insides are the most frequently unsterile material issued from the C.S.R. When I did a study 15 years ago, I recognized that the rubber glove is one of the most difficult things to sterilize in a steam sterilizer.

There must be moist heat inside the glove to destroy existing bacteria, and this can be accomplished only if a pathway is provided for steam to enter the glove and only if the glove is positioned in the sterilizer in such a way that a quick exchange of air and steam is possible, so that steam contacts the inside and outside of the glove simultaneously.

If the glove is placed in the sterilizer with the fingers upright, steam strikes the outside of the glove and condenses and moistens the outside, but when it gets around to the inside there is no heat deficit; the steam does not condense, and there is likely to be superheating and a shift from moist to dry heat inside the glove. The inside of the glove will not be sterilized.

Gloves must be positioned horizontally. They are sterilized at 250° F. for 30 minutes. They are removed from the sterilizer promptly at the end of the cycle and allowed to dry out for 48 hours on a shelf to regain their resiliency. Ethylene oxide is good for sterilizing rubber, but again, it is a tricky process, and you must know the process well to achieve consistent sterility.

Q. Do you feel that intravenous solutions manufactured in an institution are as safe for use as vacuum-sealed solutions manufactured commercially?

A. Hospital-made intravenous solutions can be just as safe pharmaceutically and every other way as commercially prepared solutions. In many hospitals, making solutions can be an economically feasible process, too.

Q. Do you feel that the C.S.R. should take care of folding linen and making packs for the operating room?

A. Preparing supplies of this kind is no longer the job of any operating room except in very small hospitals. The dust and lint from this kind of activity should be kept out of the operating room.

Q. Discuss cross-infection as it pertains to used supplies returned to the C.S.R.

A. The hazard here is to personnel. Routine central supply room processing ends the hazard to the next patient, but in between is the C.S.R. worker who must handle the returned equipment.

Technics must be developed in communicable disease areas for returning supplies to the supply room only after they have been terminally disinfected. Many things, for instance, can be placed in a polyethylene bag and run through the ethylene oxide sterilizer before the contents are handled by workers. We have discussed in detail the need for terminal heat sterilization of all syringes and needles before they are handled by workers.

How Our Laundry Washes, Wraps Gloves and Surgical Packs

By Charles B. Cook*

• For 10 years gloves have been washed, dried, and packaged in the laundry at the University of California Medical Center, San Francisco, and for the last three years surgical and obstetrical packs have been assembled in the laundry.

Both the hospital administration and the nursing staff are very satisfied with the performance of these procedures in the laundry. It has these definite advantages:

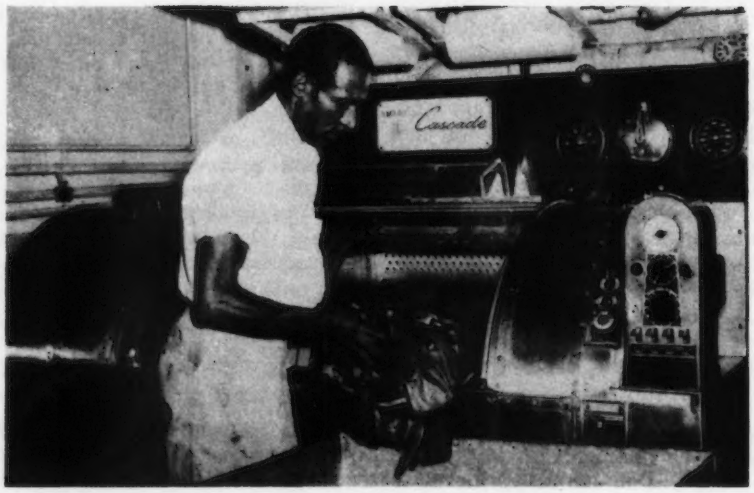
1. Centralized supervision.

2. Use of cheaper space for these activities, instead of more valuable space in the hospital building itself.

3. More effective utilization of personnel. Laundry personnel assigned to assembling packs are kept busy all the time, because they can be used in other laundry operations when they are not working on packs. (Personnel assigned to the glove room are kept busy there full time, turning out an average of 900-1,000 pairs of gloves a day.)

4. A real saving of time, and therefore of money as well, in the washing of gloves, because washing is done only once a day. If an automatic washer of the type used in homes were employed for washing gloves, several loads a day would be necessary to wash the quantity of gloves used in our hospital.

The University of California Hospital is now a 470-bed institution. Eventually, when units under construction are opened, the medical

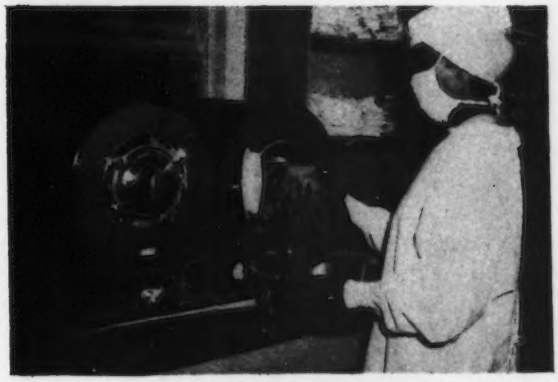


Thomas Guerry removes gloves from the washer in the laundry. They are placed in metal trucks to drain.

Fred Danzeler puts gloves in tumbler for drying. They are dried for about an hour and 15 minutes—first for 20 minutes in cold air, then for the remainder of time in a mixture of half hot and half cold air.

*Superintendent of general services, University of California Medical Center, San Francisco.

Margaret Richard tests gloves before they are packaged. Left gloves go into bins on her left; right gloves into bins on her right. Defective ones are discarded. Tester—adapted from a commercially available mechanism—is plugged into the hospital's compressed air line.



Dorothy Lincoln takes gloves out of the powdering machine. She wears a mask to protect her nose and throat passages from irritation by the powder.

Above: Dorothy Lincoln and Margaret Richard package rectal gloves, using standard muslin wrap. Right: Miss Richard, wrapping surgical gloves, lifts flap up to tuck it inside the glove cuff.

center will include close to 1,000 beds. There are 10 major operating rooms, 30 maternity beds, and 40 nursery cribs. At present the quantities of packs and gloves prepared daily by the laundry are:

Gloves—900-1,000 pairs

Surgical packs—40 major packs

Obstetrical packs—20

Diapers—approximately 1,200 for the nursery alone.

In our opinion, any hospital with a laundry should have the laundry wash rubber gloves. A small hospital which does not have a laundry of course does not have the volume that a larger hospital has, and can therefore use the home-type automatic washer, probably in the central supply department.

When we were developing our method for washing and drying gloves, the deleterious effect of heat was thoroughly considered. After research on bleaches and alkalies, we found that the only harmful ingredient was alkali, and that the operations employed by the laundry in handling rubber gloves were not harmful. We decided to use a mild synthetic soap with a low percentage of detergent, because the superficial dirt on the gloves was easily removed by the mild soap.

——GLOVE CARE ON FLOORS

After gloves are used on the floors, they are rinsed under cold, then hot, running water and placed in a bucket provided for them. They are picked up by central supply per-

sonnel on the department's regular pick-up and delivery rounds. Gloves are sent from the central supply department to the laundry several times a day, but washing of gloves is done only once a day—usually in the morning.

WASHING

Gloves are washed in a pony washer, in lukewarm water—80°-90°. Dissolved synthetic soap is added to about 10" of water. Care is taken not to raise suds. Gloves are washed for about eight minutes.

Hard water is better for washing. Zeolite-softened water, especially, is charged, and the water softens rubber.

The next step is rinsing. Gloves are given at least six two-minute split rinses in 12" to 14" of water at not more than 60° to 80°.

Adding one cup of ½ of one percent bleach to the first and last rinse helps to eliminate sticking of gloves.

Nets are not used. We do not believe that gloves in bags get the full benefit of the rinses.

DRYING

When gloves are removed from the washer, they are placed in metal trucks to drain. Then they are put in a 36 x 30 drying tumbler, and dried for about an hour and 15 minutes—first for 20 minutes in cold air, then for the remainder of the time in a mixture of half hot and half cold air. The temperature is kept below 180°.

These precautions should be observed to obtain the most satisfactory results:

1. Do not use water over lukewarm temperature.
2. Do not use nets for washing.
3. Use a mild synthetic soap. At no time have apparent suds. The use of too much soap will be the greatest problem.
4. Never wash or rinse gloves in low water. Suspension and floating in high water gives better results.
5. Do not use an extractor.
6. Do not overload or overheat the tumbler.

Dorothy Lincoln ties glove packages, which are now ready to go to the central supply department for autoclaving. Gloves are issued from and returned to central supply.

All glove envelopes are made in the laundry sewing room. Here Mrs. Dorothy Bernstein, of the sewing room staff, puts the finishing touch on an envelope.

PACKAGING

After drying, gloves are sent to the central glove room in another section of the laundry, for testing, powdering, and packaging for autoclaving.

The glove room is not a cubicle with bank-type partitions; it is a closed room, so that the glove powder does not drift out into the rest of the laundry but is fairly well confined to the room. Personnel in the glove room wear scrub gowns over their street clothes and also wear masks when they are using the powder — to protect their nose and throat passages from irritation.

From this room the gloves go to the central supply department for autoclaving.

PACK ASSEMBLY

When the laundry assumed the responsibility of assembling surgical and obstetrical packs, three years ago, operating-room personnel spent about one month training laundry personnel to fold linens and wrap packs. Since that initial training period, however, experienced laundry personnel have trained any new workers in these tasks.

Packs are loaded into big carts and sent to the central supply de-

partment for autoclaving, just as the gloves are. Actually, if the necessary equipment and space were provided in a hospital laundry, there is no reason why the autoclaving could not be done there as well.

Supplies are requisitioned by the floors from the central supply department.

Our main problem at present is a need for additional space, which will be provided in a building program scheduled to begin soon. A balcony to be added will give more space for the department's office. Rearrangement of some of the other areas will allow more space for pack assembly, which is now done in a small area at one end of the main laundry room.

What about a laundry for the small hospital? How big should a hospital be to make a laundry installation practical? Ordinarily, we would say it is not practical for a hospital under 100 beds to have its own laundry. However, because of the increase in incidence of staphylococcal infections, it may be dangerous for a hospital to use a commercial laundry.

Even if hospital personnel always autoclave contaminated linen before sending it out to the laundry, they may get back, not the linen they sent out, but linen from another institution which perhaps does not autoclave before laundering.

Left: Dorothy Kelly (l.) and Nora McMahon put inner wrap on a surgical pack. Right: They add the outer wrap. Instead of tape being used to hold the two ends of the inner wrap together, a strip of gauze is pinned on at both ends of the folds.

Right: Packs are loaded directly onto a big canvas, hamper-type cart and sent to the central supply department where the autoclaving is done.

Herbert Knox (l.), assistant foreman, loads contaminated linen into an autoclave for sterilizing before washing. Watching the operation is Walter Smith, foreman. Double bags with a blue stripe indicate contaminated linen. Floor personnel usually take the additional precaution of labeling such linen as infected or contaminated.

Set-Up Trays Designed for Efficiency, Eye Appeal, Handling Ease

• When Mrs. Margaret Lee, R.N., supervisor, central supply department, Mount Sinai Hospital, Los Angeles, was unable to find a tray for procedure set-ups with the specifications she needed, she designed a new one herself.

She had found that the shape of available trays did not fit well in the new, 8-story building which Mount Sinai moved into three years ago. Average shelves were 12 or 15 inches deep and dumb waiters were sized proportionately. To accommodate the greatest number of trays in the least amount of space, a new size was needed.

In addition, Mrs. Lee wanted a tray which would be quieter to handle, lighter in weight, and more colorful. Today, the trays she designed to meet these needs are manufactured to her specifications by General Plastics Co., Los Angeles, and are used for more than 40 types of set-ups.

The trays are made in two sizes—5½ inches by 11 inches, and 11 inches by 12 inches. The material used is Royalite, a plastic with the texture and consistency of hard rubber, which provides a firm working base and is lightweight, washable, and quiet to handle. The color is a warm blue-gray which blends with the cheerful tones used throughout the hospital. However, red trays are used for contaminated syringes and needles, thermometers and holders.

——TRAY CONTENTS SIMPLIFIED

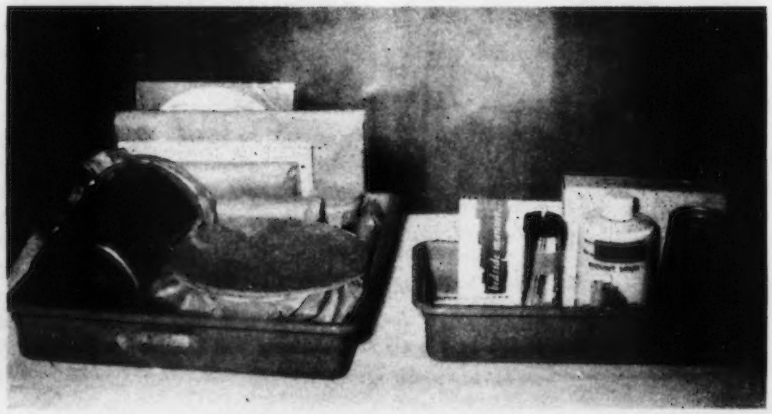
The contents of the trays underwent some redesigning also. An effort was made to simplify the set-ups so that only needed items would be included. The tray contents for each of the more than 40 set-ups were approved by physicians and departments, after which they became standard for that procedure.

Stock set-ups range from routine prep trays to equipment for bedside surgical, medical, and diagnostic procedures, such as preparations for tracheotomy or thoracentesis. One thoracentesis tray is incorporated in a spontaneous hemothorax set-up and is kept ready for emergency use at all times. A "cardiac cart," containing equipment and drugs for treatment of cardiac emergencies, is also kept in the department ready for use.

One of the standard tray set-ups is a patient admitting kit. Equipment includes a disposable urine bottle, oral thermometer, tissues, soap, and body lotion.

Factors of quietness, efficiency, and color appeal entered into the selection of items for the trays, also. Mrs. Lee introduced the use of polyethylene squeeze bottles for solutions such as alcohol and antiseptics. In addition to being quieter than glass or metal, they enable practice of a better technic.

Disposable items are used wherever possible. A disposable needle pilot program is now under way at the hospital. Ultrasonically precleaned disposable needles are attached to reusable glass syringes. Each needle is covered with a piece of Koroseal plastic tubing to assure maximum sharpness. The units are autoclaved in stainless steel boats, which are covered and issued to each floor.



Two of the standard set-ups are enema tray, which utilizes the 11- by 12-inch plastic tray, and patient admitting kit, prepared in smaller of the two tray sizes. Enema tray carries disposable tubing; patient kit's urine bottle is also disposable. Patient tray also contains cellulose tissues, prewrapped, patient-size bar of soap, body lotion.

The program is designed as a step toward better patient care by providing maximum comfort as well as safety in administration of injections. Reusable syringe and needle combinations are also used. When these are handled in the department, special precautions are taken to insure that the sharpness of the needles is not marred by contact with metal.

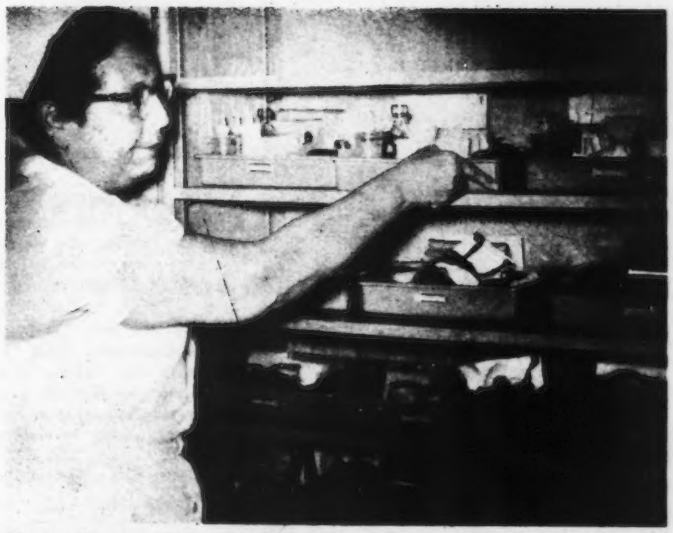
Items to be autoclaved are wrapped in paper. Carrying out the planned eye-appeal of color, the paper used is blue, in a 25-pound Kraft stock. In tests at Mount Sinai and other hospitals in the area, the paper has proved satisfactory if some care is exercised, and, as Mrs. Lee points out, "it is less noisy than parchment."

Occasionally aluminum foil is used for wrapping also. In a technic devised by Maxine Newman, R.N., assistant supervisor of the department, Vaseline gauze is wrapped loosely in two thicknesses of foil, then autoclaved. After sterilization, the folds of the foil are tightened, and the packets stored.

Only three linen items are handled by the department. These include a spinal sheet, towels for draping, and a towel for providing a sterile field, and are used for such bedside procedures as a spinal tap. Such set-ups employ a stainless steel tray. Towels and other items for the procedure are placed on the tray which is then wrapped in paper and packaged together with the sheet before autoclaving.

Surgical packs, muslin-wrapped, are made up by operating-room personnel in the surgical workroom across the hall from the central supply department. The packs are then brought to central supply for autoclaving after which they are sent to the surgery department, housed on the same floor.

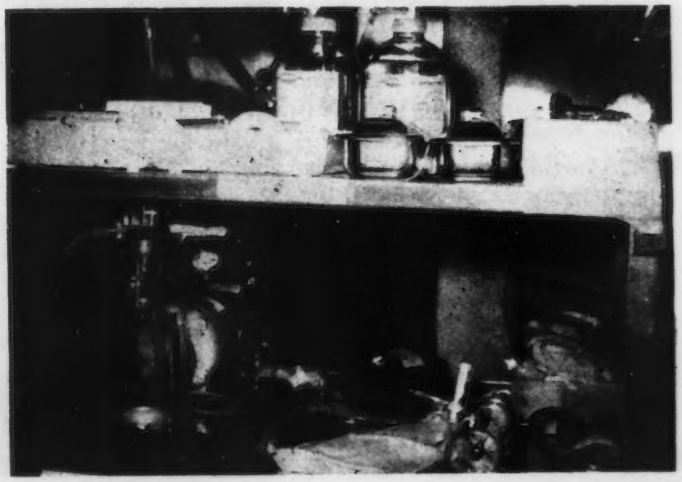
In a separate section of the surgical workroom, gloves are washed in home-type automatic machines, run at a minimum, 4-minute cycle. After being tested and powdered in this section, the gloves are brought to central supply for packaging and sterilization.



Maxine Newman, R.N., assistant central supply supervisor, lifts dressing tray from storage shelf in department's sending area. Dumb waiter which carries fresh trays and clean items to nurses' stations on each floor is in this area.

Close-up of dressing tray shows polyethylene squeeze bottles used for solutions. Sterile instruments are put in covered metal container. Tray set-up includes culture tube, brown paper bag for waste materials. Sterile gloves and towel are paper-wrapped.

Cardiac cart is kept ready at all times with standard drugs and equipment for emergency treatment of cardiac patients. Equipment also includes laryngoscope, blood pressure apparatus, disposable oxygen mask. Readings from oxygen recorder are taken by central supply personnel daily.



Mrs. Margaret Lee, R.N., supervisor of the department, demonstrates holder she devised for clean, used needles ready to be reassembled with syringes. Holder is made by covering cardboard box with sponge rubber, then bright green cloth. To guard against their nicking or dulling, reusable needles are prevented from touching metal at any time during cleaning, assembling, and storage.

Except for operating-room instruments, everything sterilized in the 170-bed hospital, including patient utensils and equipment, is autoclaved in the central supply department. In addition, the department does autoclaving of supplies for the hospital's research staff which is quartered on the top floor of the building.

WORK FLOW BY AREAS

Work flow in the department is arranged by area. Two dumb waiters connect central supply with the floors. One, located in the department's sending area, opens at the nurses' stations and is used to send clean items and trays to the floors. Stock tray set-ups are sent to the floors daily and replenished twice during the day. Other trays are sent on request.

The second dumb waiter opens at the utility rooms on the floors. On it, dirty items and used trays are sent down to the central supply utility room. There, the items are washed as they are taken from the dumb waiter; after cleaning, items are passed on to the assembly area where the trays are made up and other assembly work carried out.

In this area is a Kardex file with a separate card listing the approved, standard set-up for each procedure. As the worker makes up the tray, she checks the items on the card and, when finished, places her name on the tray.

The autoclave area is situated between the assembly area and the work-table section. In the latter area, all items are marked and then either sent to the operating room or put in the department's sending area.

The smooth flow of work in the busy department attests to the ingenuity of the over-all planning of the section just as the plastic trays illustrate the careful attention to detail.

Picture taken from assembly area of department looks into utility room. In background is dumb waiter which collects dirty items from floor utility rooms and returns them to central supply where they are cleaned, then passed over counter to assembly table.

Booklet Reviews Literature On Preventing Cross-Infection

• A comprehensive review of current thinking on control of cross-infection within the hospital is contained in the booklet, "Preventive Procedures for Combating Cross-Infection," issued recently by the research department of the Hospital Bureau, Inc., New York City.

Included in the publication is an extensive bibliography – a list of the 61 articles which were the basis for the information in the booklet.

Subjects of the 27 sections are: air conditioning and ultraviolet systems; airing of contaminated rooms; bathing of infants; bathrooms; bedside equipment; blankets; disinfectants; disinfectant paint; disposal of soiled dressings and instruments; draperies, curtains and shades; floor and wall cleaning; floor polishes; gas equipment; gowning; handwashing in critical areas; ice-making machines; laundry; linens; lockers and changing rooms; masks; mattresses and mattress covers; operating schedules; pillows; shoes for the operating room; swabs; syringe and needle sterilization, and thermometers.

Copies are available only to members of the Hospital Bureau. However, with the permission of the Bureau, we are reprinting here several sections of interest to central supply department personnel, along with the references on which this material is based. – THE EDITORS.

Disinfectants

A controversial area is the use of disinfectants in cleaning floors, walls, and furniture. The utter lack of evaluation of the majority of these products leaves their effectiveness open to question. Colbeck[1,4] substantiates this view by citing the example of a disinfectant which was claimed to have considerable persistent bactericidal effects when applied to various hard surfaces. "We tested, . . . utilizing the same type of room experiments . . . but could demonstate no residual disinfecting properties."

Geidt[2] expresses this argument a little more strongly: "It is feared that too much faith has been placed in the effectiveness of some of these chemical germicides. Unfortunately those who use these germicides are not always well acquainted with the limitations of the product and so it is sometimes used under conditions which neutralize its effectiveness. Most of these germicides have been developed under strictly controlled conditions. The manufacturer can claim effectiveness under these conditions – but these conditions are certainly not the same as those which exist in hospitals."

Starkey[3] provides reasonable evidence for concluding that "the dried material around treatment areas of hospitals protects bacteria from germicides so effectively that tests which do not allow for this are not fair indications of what we can expect from the use of such germicides."

This is not to be construed as a sweeping indictment of all germicidal disinfectants. Several have proven highly effective in use in various hospitals. What is needed, however, is a more critical analysis of the germicidal disinfectant under actual performance conditions, or in other words, a comprehensive culture program to prove or disprove its effectiveness in any specific hospital.

A word might be said here concerning cleaner-disinfectants which purportedly clean and disinfect in one step. Several such products have been actively promoted in hospitals. The United States Department of Agriculture, while reserving opinion of the value of any particular cleaner-disinfectant and stating that there was a trend in this direction, still feels that hospital cleaning is a two-step process: first clean, then disinfect. In addition, the Bureau's chemical consultants point out the difficulty inherent with a combination one-step cleaner-disinfectant; in their opinion much of the disinfectant ability of the cleaner-disinfectant would be vitiated by the masking effect of the dirt on the floor. They advise visual cleanliness before applying a well-tested disinfectant. Therefore hospitals should have quite a few mental reservations before purchasing these newer-type products which have yet to be proved in use.

Bibliography

1. Colbeck, J.C., M.B., B.S., and Sutherland, W. H., F.R.C.S (C). "Staphylococcal Infections in Surgical Units: The Need for Comprehensive Control." *Canadian Journal of Surgery*, October, 1957, pp. 1-8.

2. Geidt, W.R., M.D., "Clues to Control of Hospital Infections." *The Modern Hospital*, Vol. 90, April, 1958, pp. 88-94.

3. Starkey, Hugh, M.D., and

Aubert, E., B.A., B.C. "Germicidal Soaps or Detergents for Hospital Use." *Canadian Services Medical Journal,* November, 1957, pp. 679-683.

4. Colbeck, J.C. M.B., B.S., et al. "Studies in Hospital Infections, 1." *Canadian Services Medical Journal,* Vol. XII, July-August, 1956, pp. 563-580.

In conjunction with their revaluation of wound dressing technics, many hospitals have also shown renewed interest in the disposal of soiled dressings and instruments. One such institution[5] places soiled dressings in paper bags to be incinerated or autoclaved. All instruments, linens, gloves, etc., used in the dressing procedure are placed in paper bags for sterilization before being cleaned or handled. After this they go through the usual cleansing, packing, and sterilizing. Temple University Hospital[6] pays especial attention to soiled instruments. These are autoclaved prior to being washed to protect the cleaning personnel from contamination of the hands.

Caswell[6] emphasizes the importance of autoclaving dressings before disposing of them, and of instruments prior to their cleaning as an important change in technic. If either is put into a large can or bag carelessly, there is danger of its being transported all through the hospital. Frequently the bag breaks and dangerous bacteria are spread. He cites the absence of cutaneous infections in a year and a half from instrument cleaning personnel as evidence of the efficiency of autoclaving first, then cleaning.

Howe[7] is mentioned as having exceptional success with special septic sets for wound dressing. Each set contains the necessary instruments for changing the dressing and is accompanied by a mask, sterile gloves, and a large wax paper bag for immediate disposal of soiled dressings. Bags are deposited in a closable container, the contents of which are incinerated daily. These septic sets are prepared in CSR and unwrapped at the bedside. When each dressing is finished, all the instruments in the set are sent for autoclaving before cleaning and sterilization.

Bibliography

5. Burnett, W. Emory, M.D., et al. "Program for Prevention and Eradication of Staphylococcic Infections." *J.A.M.A.,* March 8, 1958, p. 1183.

6. Caswell, H. Taylor, M.D., et al. "Staphylococcal Hospital Infections." *Hospital Topics,* July, 1958, pp. 83-95.

7. Howe, Chester, W., M.D., et al. "A Discussion of the Medical and Administrative Problems Involved in the Control of Staphylococcal and Other Infections in Hospitals." *Hospitals, J.A.H.A.,* Vol. 31, June 16, 1957, pp. 47-66.

Additional Bibliography

15. Godfrey, Mary E., M.D., and Smith, Ian Maclean, M.D. "Hospital Hazards of Staphylococcic Sepsis." *J.A.M.A.,* March 8, 1958, pp. 1197-1201.

16. Adams, Ralph, M.D. "Prevention of Infection in Surgical Wounds." *The New England Journal of Medicine,* April 4, 1957, pp. 625-628.

Gas Equipment

Macpherson[8] investigated oxygen therapy equipment for pathogenic bacteria and found contamination greater than anticipated. He lists the following sterilization schedule for humidifying apparatus at Ohio State University Health Center.

1. Water must be sterile. Should be discarded and replaced when the level falls.

2. Apparatus must be dry and not allowed in service for longer than one week.

3. Glass reservoirs should be inverted or covered. Must be cleaned each week with soap or detergent and good disinfectant. Rubber washer should be inspected and replaced, if defective due to cracks or frayed ends.

4. If suitable equipment is available, the metal top of the humidifier should be autoclaved after individual patient use.

5. Wherever possible, disposable tubing should be used.

6. Bacteriological spot checks should be run at regular intervals.

Positive pressure incubators and infant resuscitators should be sterilized between use.

Anesthesia equipment, including masks, tubes, and bags, must be suitably cleaned between patients[9]. Joseph[10] counsels the cleaning of anesthesia tubes and rebreathing bags, prior to and immediately after use, with water and a liquid soap containing hexachlorophene.

Bibliography

8. Macpherson, C.R., M.D. "Oxygen Therapy — An Unsuspected Source of Hospital Infections?" *J.A.M.A.,* Vol. 167, June 28, 1958, pp. 1083-1086.

9. Jewetz, Ernest, M.D., and Grossman, Moses, M.D. "Three Ways to Fight Infections." *The Modern Hospital,* Vol. 90, May, 1958, pp. 92-100.

10. Joseph, J. Mehsen, Ph.D., "Disease Transmission by Inefficiently Sanitized Anesthetizing Apparatus." *J.A.M.A.,* Vol. 149, July 26, 1952, pp. 1196-1198.

Mattresses, Mattress Covers

Mattresses have been shown to be dangerous reservoirs for infectious bacteria and it seems probable that the bellows action of a modern spring mattress promotes the spread of bacteria and amount of contamination more than the older felt or hair mattresses. The spring mattress also presents sterilization difficulties as it is soon ruined by steam and deteriorates when exposed repeatedly to formalin vapor[11,7]. Such problems are said to be non-existent with either neoprene foam or CURON (Curtiss-Wright) mattresses, both of which are claimed to be repeatedly autoclavable.

Starkey[11] feels that ethylene oxide sterilization would be best for mattresses. Since this type of sterilization equipment is now commercially available, it would be well for all hospitals to investigate it.

Lepper and Howe[7] have brought to light the inherent difficulties with plastic mattress covers, namely, that they do not completely enclose the mattress, thus leaving

the underside of the mattress exposed. Starkey[11] reports that the imperviousness of plastic mattress covers to moisture creates too much discomfort for routine use. Colbeck[4] considers the use of plastic mattress covers unsuitable because sweating patients find them uncomfortable. Such items also tend to wrinkle and render the patient liable to bed sores. He also emphasizes the main danger with these units: they do not protect the underside of the mattress where infected bedclothes are tucked in. However, he[1,4] describes the use of ticking mattress covers impregnated with Triton: Mineral Oil Emulsion (0.5%) plus a quaternary ammonium compound, Fixanol C (1:400) in the final laundry rinse. These have been in use for two years and have been found to be very efficient in reducing contamination.

Bibliography

11. Starkey, Hugh, M.D. "Control of Staphylococcal Infections in Hospitals." *The Canadian Medical Association Journal,* Vol. 75, 1956, pp. 371-380.

Additional Bibliography

17. Mudd, Stuart, M.D., "Staphylococcic Infections in the Hospital and Community." *J.A.M.A.,* March 8, 1958, p. 1177.

18. "Hospital Bedclothes." *The Lancet,* October 4, 1958.

Syringe, Needle Sterilization

Any of the following methods of sterilization for needles, syringes, lancets, and similar piercing instruments are acceptable, according to the authorities cited:

1. Dry heat for 2 hours at 338°F.[12] The New York State Department of Health states that half an hour at 170°C. (338°F.) is adequate if temperature is distributed evenly over the oven area; otherwise one hour at 356°F. at 15 lb. pressure[13].

For the express purpose of preventing infectious type hepatitis, boiling in water for 15 minutes (or 10 minutes boiling after thorough washing) is recommended[12]. (However, as a standard sterilization procedure, the boiling water technic is not wholly reliable, particularly whenever spore-bearers may be encountered.)

Autoclave sterilization to be effective requires a thorough knowledge of the technical procedures involved. Unless operators are specially trained in the use and control of the equipment, patients will continue to be exposed to the unnecessary hazard of infection caused by the use of imperfectly sterilized articles[14].

Bibliography

12. "Sterilization of Instruments for the Prevention of Hepatitis." *The Journal of Pediatrics,* Vol. 51, October, 1957, p. 491.

13. New York State Department of Health and the American Public Health Association. *Guide for the Prevention and Control of Infections in Hospitals,* April, 1958.

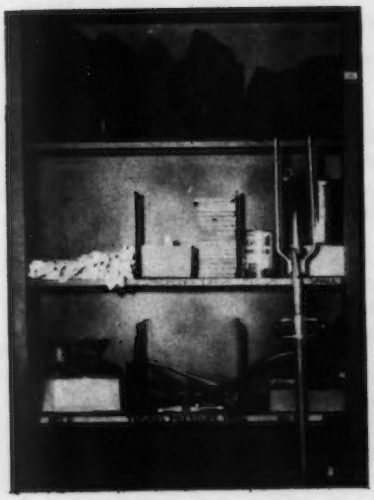
14. Working Party of the Medical Research Council. "Sterilization by Steam Under Increased Pressure." *The Lancet,* February 28, 1958, pp. 425-435.

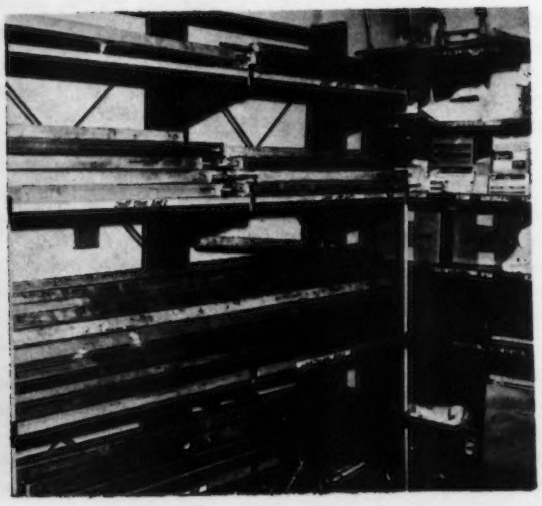
Small Area Provides Efficient Storage of Fracture Equipment

● Roosevelt Hospital, New York City, has the problem of providing efficient storage of equipment used for fracture patients — not an unusual problem, but in this instance it was complicated by these factors:

—The hospital does not have a fracture service concentrated in one area; cases are spread throughout the hospital. A technician is on duty eight hours a day to fill requests for fracture equipment — but after hours and on weekends doctors or orderlies from other areas must be able to find easily the equipment they need.

—Orthopedic equipment is the responsibility of the central service





Left: Fracture room is small, but all available space is used. Applying pegboard to inside of door gave additional place for hanging manufacturers' literature and small items. At lower right is chart with pictures of various types of equipment—each numbered to correspond with numbers on storage shelves.
Below, Center: At left of door are shelves for storage of sandbags, spreaders, Thomas pressure pads, fracture bar clamps, and pulleys.
Below, Right: Crossbars and uprights — bars used to make a Balkan frame — are stored on one wall, adjacent to shelves shown in the second picture. Shelves, right, hold Boehler leg splints, stockinettes, plaster, sheet wadding, gauze, felt, and pelvic slings.

department, but until the new department is constructed, various central-service functions are found on three different floors.

The problem was solved by setting aside a room for storage of fracture equipment, and posting in it pictures and charts which enable personnel not familiar with the equipment to find whatever they need.

The first equipment storage room was in the basement. The room now used is on the first floor. It is a former office, across the hall from an observation ward which is used as an admitting ward or as a unit for initial emergency treatment of patients who cannot be moved. The emergency department itself is at the opposite end of the corridor.

The technician on duty works under the supervision of Mrs. Muriel W. Jones, R.N., supervisor of central service.

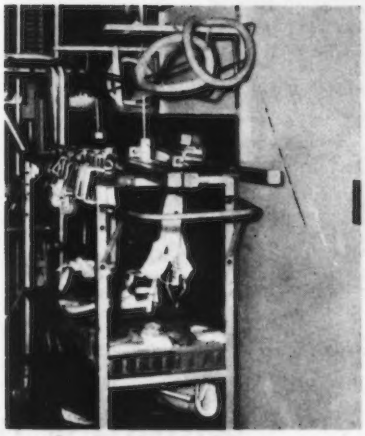
A fracture cart was designed to save trips back and forth for equipment. It contains all necessary equipment and materials for treating fractures (see accompanying list of cart's contents). After hours and on weekends the observation ward orderly or the physician gets the cart from the fracture room when he needs it.

A chart with a picture of each piece of equipment is placed just inside the room. Each picture is numbered. The same number is on the shelves or racks where the equipment is stored, so that a doctor, a new orderly or technician, or anyone else coming in after hours can find the name of the equipment he needs and then locate it, by its picture and number. The chart was originated by Mrs. Frances Stankevitz of the central service staff.

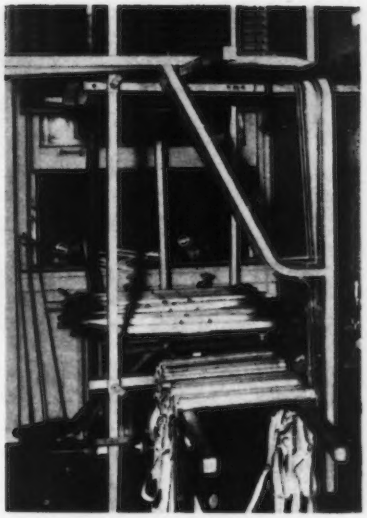
Bed boards, extra trapezes, and some other equipment are stored in the central service department on the sixth floor.

When the central service department now planned is completed, orthopedic equipment will be in one central equipment room next to the central sterile supply area.

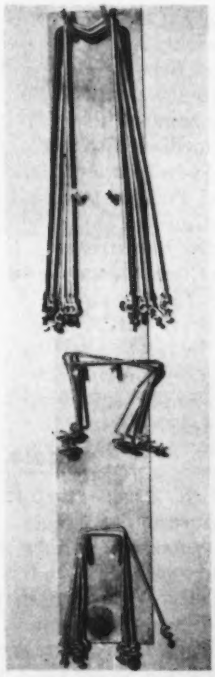
The arrangement of the present storeroom is shown.



Above: Fracture cart, when not in use, is stored against wall next to door.

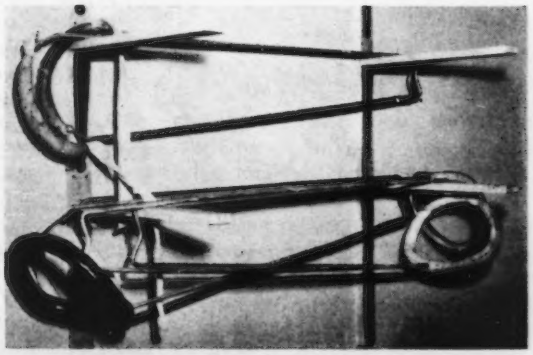


Above: Racks for storage of trapeze setup built from old fracture equipment.

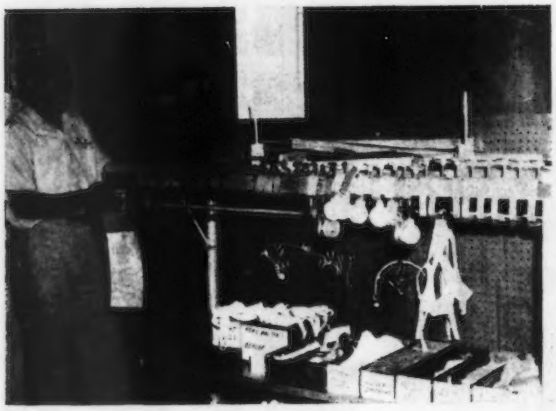


Left: At right of storage cabinet, shown on page 28, is rack hospital carpenter built for storage of accessories for Thomas splint—Pearson attachment.

Below: Racks for Thomas splints were also built by hospital carpenter. They are hung on wall above fracture cart.



Right: Mrs. Muriel W. Jones, R.N., supervisor of central service, and Rudy Williams with fracture plaster cart. The plaster cart is used when a cast is to be applied or removed on the nursing unit rather than in the plaster room or operating room.



Rudy Williams, technician, starts on his way with the fracture cart to answer a call.

CONTENTS OF FRACTURE CART

Top Shelf

1 Basic Balkan Frame as Follows:
"A"–Short Upright, 2
"B"–Long Upright, 2
"C"–Short Cross Bars, 2
"D"–Longitudinal Bars (with holes), 2
"H12B"–Long Fracture Bar (without holes), 1
"H12C"–Intermediate Cross Bar, 1
"H12R"–Non-Swivel Pulleys (with clamp), 2
"H12K"–Swivel Pulleys (with clamp), 2
"H12F"–Fracture Bar Clamps, 6
"H12C"–Exercise Bar (trapeze), 1
Plain Clamps (not shown), 2

Also Include These Extras

6 Non-Swivel Pulleys, "H12R"
6 Swivel Pulleys, "H12K"
6 Plain Clamps (not shown)
2 Fracture Bar Clamps, "12F"
2 Thomas Pressure Pads

Middle Shelf

Weights: ½ lb., 1 lb., 2 lb., 3 lb., 5 lb.
Box Containing Spreaders
Box Containing Nuts and Bolts for Balkan Frame and Small Pulleys
Box Containing Towel
Box Containing Sheet Wadding, Crepe Bandage, Muslin Bandage
Box Containing Slings
Box Containing Bag Holders for Weights
Box Containing Buckle Slings for Thomas Splints
Box Containing Traction Rope
1 Roll Stockingette
1 Can Benzine
Tongue Depressors

On Back of Middle Shelf

4 Head Halters
1 Buck Extension
Wire Splints
2 Bars for Head Halters

Bottom Shelf

1 Roll Felt
2 Thomas One-Half Splints
1 Thomas Full Splint
2 Pearson Extensions
2 Sand Bags

Sterilization of Cystoscopy Instruments and Accessories

By Leo Cravitz, Dr. P.H.,
and Virginia R. Tyler, R.N.*

1. Scopes should be physically cleansed by a technician or nurse. The instruments should be disassembled, rinsed in cold water, and thoroughly washed with tincture of green soap. The interior of a sheath and inaccessible surfaces can be cleaned by scrubbing with a soft brush. The components should then be rinsed, shaken dry and placed in metal cystoscopic basins in sets.

Sterilization of cystoscopy instruments poses a special problem in surgical asepsis. Instruments with intricate lens systems, rheostats, cautery and illuminating cords as well as cutting instruments, are all subject to damage resulting from the high temperature and humidity of steam autoclaving.

Because of this problem, cystoscopy instruments and accessories have heretofore normally been processed in various disinfectant solutions.

The shortcomings of "germicidal" solutions in a process requiring disinfection of scopes and the long, narrow lumen of catheters are well known to operating-room personnel. Not only does inadequate sterilization of cystoscope components and catheters pose a problem in cross-infection, but it also plagues the urologist with erroneous data in his attempt to make a bacteriologic diagnosis.

Extensive tests have been made recently to determine the effectiveness of gaseous ethylene-oxide sterilization in the processing of cystoscopes and accessories. The results have been singularly successful, and a cycle has been established which not only guarantees sterilization without damage to lens elements, plastic parts, or electric components, but also establishes the complete practicability of prepackaging the cystoscopes and accessories in polyethylene. This practice permits shelf storage in a sterile condition for periods in excess of one year.

The efficacy of gaseous ethylene oxide as a sporicidal and virucidal agent is known by now to almost all hospital personnel responsible for asepsis. Its particular advantages in hospital application are its great penetrating power and ability to sterilize within a low temperature range of from 100-160° F., with moisture held as low as 35-50 percent relative humidity.

The gas easily penetrates plastic bags, and, because it operates under low pressure within the sterilizing chamber, it effectively penetrates mechanical linkages, tubes, and other small orifices which often remain unaffected by more passive sterilizing agents. Sterilization with ethylene oxide gas is dependable, however, only if the gas is introduced at proper concentration, temperature, relative humidity, and pressure.

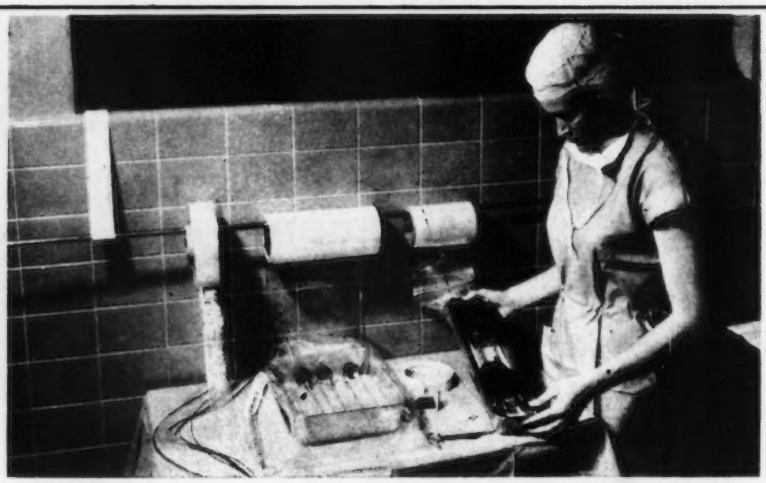
Ethylene-oxide sterilizing equipment shown in the accompanying photographs controls these characteristics automatically, thus assuring reproducible cycles and results once a proper cycle has been determined.**

Cycle time, temperature, and humidity are controlled by dials on the sterilizer control panel, and every phase of the complete cycle is immediately visible on the control-panel dials. A permanent record of each cycle is automatically maintained by a two-pen pressure-temperature graph on the panel.

A typical cycle for cystoscope

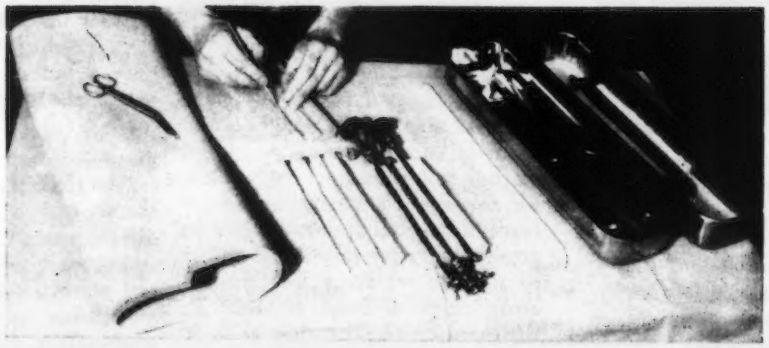
*Dr. Cravitz is microbiologist-in-charge, Rochester (N.Y.) General Hospital, and Miss Tyler is operating-room supervisor at that hospital.

**The ethylene-oxide sterilizer shown in the photographs is the Sterox-O-Matic, manufactured by the Wilmot Castle Co.



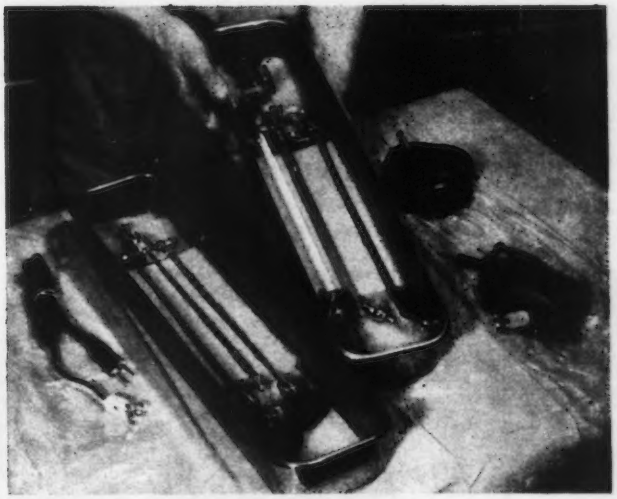
2. Polyethylene sleeving, 2 to 4 mils thick, is pulled over the metal trays containing the instruments, and both ends are sealed with paper clips, Scotch tape or an electric heat sealer. The polyethylene sleeving can be purchased in convenient sizes for specific jobs. Experience has indicated that the 2" width is suitable for catheters, the 7" width for 4"x7" catheter trays, and the 14" width for general instrument trays.

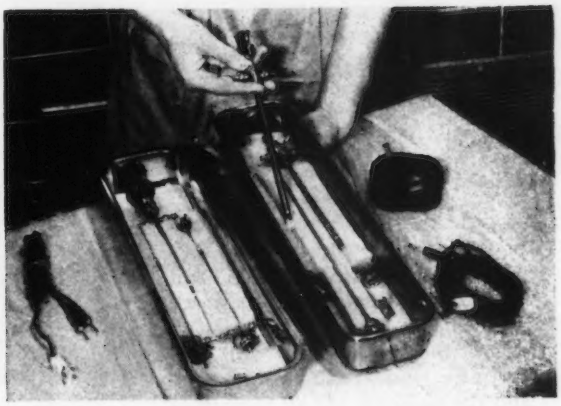
3. The end of the polyethylene tubing must be closed in a manner that will protect the lip until it is reopened at the instrument table. By folding a square of light cardboard (approximately 6" x 6") over the gathered polyethylene bag end, as shown in the illustration, then making a dual fold-back, one can tuck the cardboard end into the first folds. Adding paper clip or tape, or marking the cardboard with sterility data, can be done at the discretion of the operator.



4. Polyurethane foam is an excellent material for nesting instruments in trays. Polyurethane, ½" thick, can be cut to form a pad at the bottom of the tray, while the ¾" material can be easily hollowed out with a scalpel to accommodate four or five components as shown. The polyurethane not only provides support for flexible instruments but prevents damage from impact between components.

5. **Right: Here are a standard cystoscope tray with cystoscope components loosely assembled in their sheath, and a resectoscope tray complete with cauterizing and illuminating cords. The effectiveness of the polyurethane in keeping components firmly in place is evident.**





6. **Left: This photograph shows the recommended method of preparing trays for endoscope sets. The polyurethane can be cut to accommodate instruments of any size, and space can be made for various small fittings and light bulbs.**

sterilization requires approximately four hours, at a temperature of 130° F. and relative humidity of 35-50 percent.

PROCEDURE

The procedure shown in these photographs is offered for example only. Alternate procedures or tray arrangement and different packaging materials may be used.

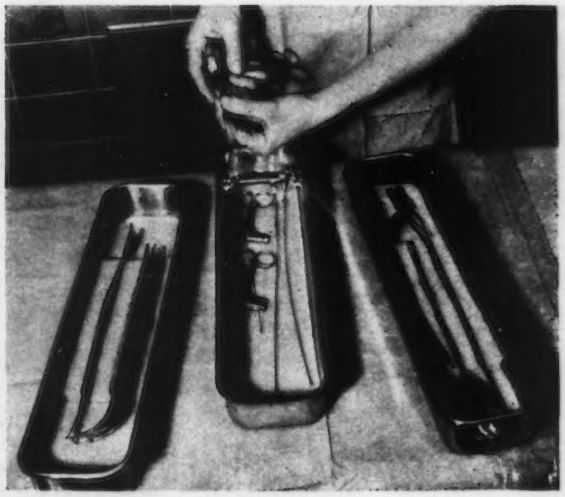
The logical time to begin processing of cystoscopy instruments is immediately following an operation. The instruments should be removed from the surgical table and sorted. Scopes should then be placed in a soaking basin containing a detergent-germicide which will grossly disinfect on short exposure without tarnishing or injuring the instruments.

After gross disinfection, surgical instruments should be placed in a container and removed to a washer-sterilizer, if one is available. In the absence of a washer-sterilizer, the instruments should be placed in a soaking basin containing a blood solvent, and should be manually cleaned and decontaminated prior to storage.

TESTING

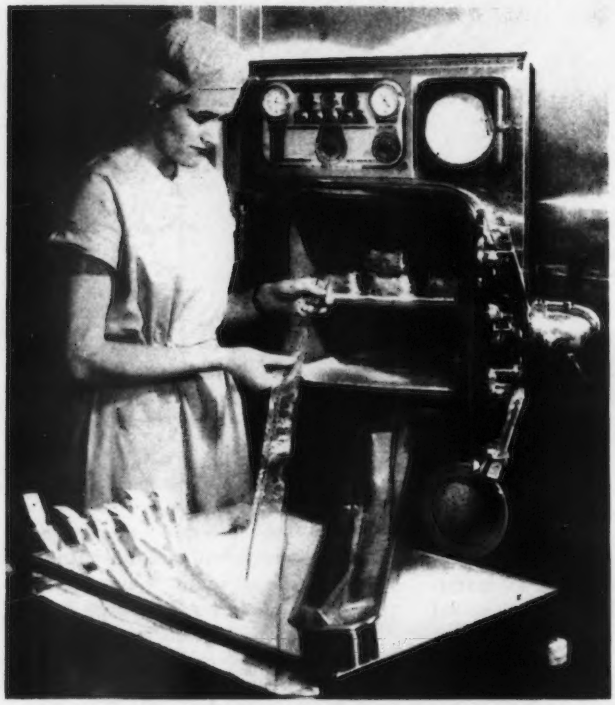
It is important to know the various ways of testing the reliability of the gas sterilizer cycle. An ethylene-oxide-sensitive tape is available which will provide visual evidence that items have been processed. However, this tape is a chemical indicator only and cannot be used to determine sterility.

Spores of *B. globigii* and *Cl. sporogenes* have resistance to ethylene oxide that is equal to pathogenic organisms. Furthermore, bac-



7. **Right: Obturators, biopsy forceps and a cautery lampcord assembly are prepared for sterilization. Note that the obturators and the biopsy forceps have been disassembled.**

8. Below: Rubber catheters are laced through the holes of commercial cardboard catheter-holders, and the assembly is then inserted into the polyethylene tubing with the holder protruding. (The long, small-diameter urethetal catheters are inserted in the polyethylene tubings without cardboard holders.) The end of the tubing is then accordion-folded and closed with paper clips, so that the sterile catheter can be handled without fear of contamination. Note the long (4" x 29") catheter tray.



terial spores are five to 10 times more resistant to ethylene oxide than the pathogenic vegetative bacteria. Thus, spore strips containing 100,000 to one million spores of *B. globigii* or *Cl. sporogenes* are ideal for determining the efficiency of the process. Paper strips with the above spore concentrations are available commercially.

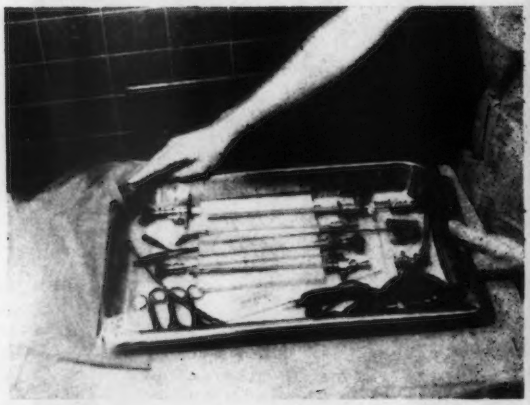
It is recommended that all types of packs be rigidly controlled by using spore indicators when the process is first used. Once an effective routine has been established, only occasional spot checks need be made.

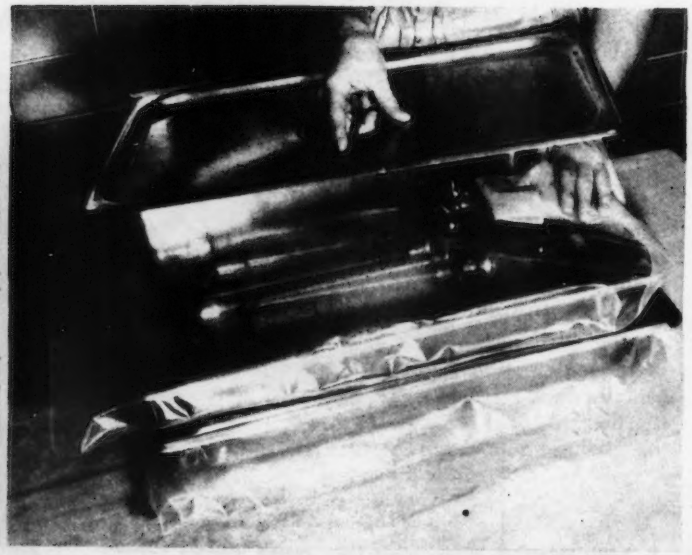
When biologic indicators prepared in one's own laboratory are used, the infectious inoculum should be carefully quantitated. It should be remembered that this process is a highly specialized form of chemical disinfection. As in all germicidal testing, the concentration of the bacterial inoculum, the exposure time, the temperature and the moisture are all important factors influencing the efficiency of the germicide. It is strongly advised that bacterial or spore inocula be limited to approximately one million/sq. cm. of surface.

SPECIAL NOTES

In packaging the various instruments and trays, as much air as possible should be removed from

9. Below: A complete cystoscope kit is shown here. A large tray containing an assortment of catheters, forceps and a scope can be sterilized and stored until required for use. Because the polyethylene wrapper provides extended aseptic shelf life, frequent resterilization is no longer necessary.





10. A cover is placed on the tray after the large cystoscope kit has been wrapped and sealed. The cover permits stacking several large trays with complete safety.

11. The final step: loading the sterilizer. The number of instruments which can be sterilized simultaneously will vary with the type of instrument and the size of the pan. If it is convenient, the center shelf can be removed from the sterilizer chamber to permit stacking the pans. Under these circumstances, the instructions which come with the sterilizer should be followed closely.

the polyethylene sleeve before the final closure is made. When a high vacuum is drawn quickly within the chamber during the evacuation cycle, any air that remains in the package will tend to expand. If a great amount of air is trapped in the polyethylene wrap, the package may rupture.

An alternate method of "sealing" is to introduce a strip of bacteriologic cotton filter into the closure fold, and let some of it remain outside the neck of the polyethylene. This procedure enables the package to "breathe," while at the same time providing a seal against any outside contamination.

An Ex-Supervisor Speaks...

. . . on why a nurse should head CSR

. . . on 'status problems'

. . . on the challenge of central service

An interview with Mrs. Betsey R. Carroll, R.N.*

For almost 10 years Betsey Carroll was head of the central service department at the University of Kansas Medical Center. During that period she became well known, through her articles and appearances at hospital and nursing meetings, as an efficient young administrator, full of enthusiasm for the challenge offered by the problems of central service operation, and full of ideas for simplifying methods and improving service.

Mrs. Carroll left her job to move to New Mexico with her husband, a physician. But her interest in central service has not lagged. In response to a request from HOSPITAL TOPICS, she agreed to give her opinions on some of the major problems faced by central service departments.

Q. There seems to be a trend in some areas today toward eliminating the nurse from the central service department. Many departments have only one nurse on the staff – the supervisor. Some administrators, other administrative personnel, and hospital consultants have expressed the opinion that there is really no need for a nurse in central service. A few hospitals are experimenting with lay supervision. What do you think? Is a nurse needed? If so, why?

A. I feel it is essential to have a nurse in charge of central service. The purpose of this department is to give good patient care through the professional staff, by providing the supplies and services the doctors and nurses need.

The person in charge must first understand what it means to care for someone who is sick. She has to understand the patient's side of the story – know what his needs are – and then know what the professional staff needs to give good care, to help the patient get well.

If the supervisor has no understanding of the patient's needs, it becomes very difficult for her to understand what is necessary to care for him, and to help members of the professional staff when they ask for advice on specific problems – even to anticipate their needs and make suggestions for improvements in methods before a request is made.

Furthermore, I think that a professional person can deal more effectively with other professional people than someone without a professional background. She can talk their language. Doctors and other nurses are more likely to listen to her and respect her opinions and her suggestions on matters of patient care—because they know she has been professionally trained.

Q. Ideally, how many registered nurses do you feel the department should have?

A. In hospitals of 250 beds and over, I believe that the central service department should be open on a 24-hour basis and that there should be a nurse in charge of each of the three shifts and a fourth nurse to work as relief for the other three.

In hospitals of less than 250 beds, there should be at least two shifts, with an R.N. in charge of each, and one nurse to work as relief. The third shift in the small hospital could be covered by the night supervisor. She should be familiar with the organization of the department so that she could obtain the necessary sterile supplies and equipment needed during the night for the professional staff and be able to set up an area in an emergency.

Q. What are your feelings about having practical nurses in the department?

A. I wholeheartedly approve of

*Formerly administrative supervisor, central service, University of Kansas Medical Center, Kansas City, Kans.

having practical nurses work in the department. Their contribution to the total patient care in an area like this is as important as that of others' work in the area. The number and types of other personnel needed in the department of course are dependent on the size and kind of hospital, the size of the area designated for central service, and the type of service the department is going to perform.

Regardless of the hospital's size, however, I still believe that an R.N. should be in charge of each shift.

If registered nurses are not available and there are practical nurses who understand aseptic technic and show other abilities necessary to carry on, then I see no reason why a practical nurse should not be in charge. But I don't think a lay person should be in charge. You will always find a few outstanding exceptions to this rule, of course.

Q. What do you think about putting the department under the supervision of the pharmacist?

A. I am not in favor of this arrangement for supervision of this area. The pharmacist has enough to do to keep up with the great volume of new drugs coming on the market and to keep his own area working smoothly. He has not the time to see that the central service department is working properly or carrying out the technics that are necessary.

In addition to the above, he probably is not well enough acquainted with the supplies other than drugs which are needed in patient care. Chances are, the pharmacist's education has not included sufficient emphasis on the principles of aseptic technic for the care of supplies.

I think it's not a good idea to put the central service department under the O.R. supervisor or the obstetrical supervisor either. These persons have their hands full doing their own jobs. No one person can divide herself and work at top efficiency. Central service supervition should be made the responsibility of one person – a person who has duties and responsibilities in no other department.

Q. You feel very strongly that nurses are needed in the central service department. How many nurses are entering central service work? Is there a shortage of nurses for this area – or is the shortage no greater than that in other departments?

A. I would say that the nursing shortage in central service is far more acute than that in other areas, because nurses have not had sufficient training in the importance of supplies in total patient care. In the past emphasis in nurses' training has been placed on bedside care and it is only within the last few years that nurses have become aware that there are other facets of patient care in the hospital.

Lack of respect for central service work has perhaps kept some nurses from going into it. Some administrators have contributed to this feeling by treating central service as a department to which they could assign older nurses who could no longer stand the strain of floor duty work in the operating room or delivery room. I have known some of these older nurses in central service, and they felt that the hospital was making a "last-ditch" endeavor to keep them – and they resented it. Consequently, they did not look at their new job as a new challenge – a new field that could be just as interesting as work in the operating room, the delivery room, or other nursing areas.

I think most central service nurses at this point have been placed in the department with little or no knowledge of what they were getting into, and all of us had to learn by trial and error.

Q. You're saying, then, that some nurses feel central service work has less professional status than work in other nursing departments?

A. Yes. Central service work seems to many not to have the status or glamor of other hospital nursing. Central service has always been in the basement – under cover – and professional people do not like to be shoved off into the lowest depths of the hospital. Some nurses have felt that transfer to central service was a demotion because they were being placed in an area away from the patient. They felt that they were being forgotten – no longer needed.

Actually, I wholeheartedly disagree with the idea that central service work is a nice, soft, sit-down job. As a central service supervisor, I'm sure I did more walking than the average floor nurse. Twenty-five years ago central service department personnel sat down and did many things by hand, such as rolling bandages and making cotton applicators. But now, with all our modernization of supplies and technics, we no longer sit and make supplies. Central service work requires people who are wide awake, who can work hard, and can work well with others in close proximity.

Q. How did you happen to become a central service supervisor?

A. I have always enjoyed management and administration in a hospital as an institution. I like to see activity well coordinated and efficient. To me it's a challenge to get people to work with you because they respect you and feel that you respect them and that they play an active part in the project you are doing.

When I came to the University of Kansas Medical Center, after a year in bedside nursing and three and a half years in industrial nursing, I told the director of nursing that if I could have my choice, I would prefer a position other than bedside nursing.

After I had worked three months on the TB unit, the central service opening came up, and it was offered to me.

All I knew about central service was that it dealt with supplies that were needed by the professional staff in the care of the sick. I went into the job with the idea that I would learn everything I could.

I realized the importance of supplies in giving care to the patient – that if you didn't have the proper supplies, proper technic in processing these supplies, and proper distribution and service, the professional people could not work efficiently. With institutions getting larger and more complicated in personnel and in treatment, there had to be somebody who could see all facets of patient

care and could correlate these things so that everybody could work at the maximum efficiency, pleasantly, and in an organized fashion.

Because I felt that I understood nursing, I thought I understood the professional needs involved in giving good patient care from this area.

In starting this job, I found it necessary not only to study problems of budgeting but to study supplies of all kinds in order to learn as much as possible about them. Only in this way could it be determined how to use them most effectively. Also, I began to discuss with physicians and nurses the proper use of supplies and methods for conserving them in order to maintain hospital economy.

Q. What would you say are some of the principal qualifications needed by a CSR supervisor?

A. She needs to have a good understanding of patient care, of the needs of hospital economy, and of management policies.

She should be an alert, "on-the-ball" type of person — one who can handle people and be a wonderful diplomat in handling ticklish situations.

In addition, she has to be a good salesman, in order to put across her product to the people who are going to use it — so that they understand that the product and proper use of it are essential in total patient care. It's too bad that she has to keep selling her department. I think in another few years the department's services will be well enough known that this constant selling will not be necessary.

Q. What would you say were some of the most challenging facets about your job?

A. The most challenging thing about central service work is to keep everybody working efficiently and in an organized manner, using the best technic, getting the job done in a good requisite of time, and having everybody happy at the same time.

To me, the challenge was to find better ways of doing things, so that I could introduce new methods and products to the hospital in order to help the hospital as a whole improve its efficiency in patient care and aid hospital economy.

One of the most satisfying things about working in central service was to be recognized by the hospital staff for doing a good job.

Q. What was your biggest problem?

A. Inadequate personnel. So frequently there was a lack of proper screening of the people hired for this area, probably because those hiring personnel did not sufficiently understand the requirements for good workers in this area. As a result, we received many people who were not capable of doing a high standard of work.

There were times that some of us in central service felt that perhaps we were running rehabilitation centers. Every time the floors had somebody they couldn't get along with they would say, "Send her to CSR," when perhaps she shouldn't have been kept on the staff at all.

Central service employees must be able to work well in emergency situations as well as being extremely dependable and responsible for their assigned duties; otherwise, by having such incompetent people in this area the risk that the supplies may not be properly prepared could result in a tragic error.

One result of inadequate screening of personnel was that we sometimes had a great range of intelligence in the employees — a tremendous spectrum of capabilities. Some persons were perfect gems; others were impossible to handle.

When you have too mixed a group working together in an area, you have personality problems, as well as management and efficiency problems. This was my biggest frustration, and I think it's perhaps a frustration of many central service supervisors.

Q. It has been said that morale is difficult to maintain in a department like central service, whose employees do not have direct contact with the patient. What suggestions would you give for maintaining morale in this department?

A. I have always tried to create among employees the feeling that I respected them and their opinions and suggestions. This motivated them to try for greater efficiency, organization and economy.

There should be some form of recognition for people working in this area. I made it a point to recognize the efforts of employees who tried especially hard by complimenting them on their efforts. This created a good feeling and made them want to work harder to improve the area even further. Personnel problems are greatly reduced if you give employees a feeling of participation and the knowledge that their contributions will be noticed.

I don't believe that wages in themselves are as important to the average employee as knowing that his efforts are appreciated. If people are not recognized for what they do, they may eventually feel that they are not being properly compensated. This in turn will lower their morale and their total efficiency.

I think that the supervisor should have an educational program for her employees, in order that they may be thoroughly acquainted with the objectives and functions of the department. Such a program will make it much easier to make necessary changes. The employees will accept changes more readily and understand why they are desirable.

If there is a way of recognizing the efforts of other departments in handling supplies well, I think this is a good idea. At our hospital, the central service department gave a basket of fruit every month to the ward which had made the most conscientious effort to educate its personnel about the care and use of supplies.

Q. What do you think nurses in central service can do to stimulate interest in their work among other nurses?

A. I think if there were a postgraduate course in the operation of central service departments, interest might be aroused and the quality of person available for this area would improve. To my knowledge, there is at present no place available, except possibly under Dr. Carl Walter, to which a nurse can go to learn about aseptic technic and about all phases of central service department operation. Nurses in central service have felt that the department could be run with far less trial and error if there were a postgraduate course which would give instruction in the handling of supplies, in the principles and practices of good sterilization and purchasing.

I would like to see four regional centers available for postgraduate work in central service. Then things which pertain to particular areas or surroundings could be presented. Not all parts of the country are alike. Sterilizing technics should be standardized, of course, and many other things could be also. But I think that some material on management might differ from area to area.

In my opinion, an intensive, well-organized program could be set up to cover all phases of central service in an eight-week course.

Q. Whom would you draw on for instructors?

A. It would depend somewhat on the people available in the surrounding area. Certainly there should be representatives of hospital administration, nursing service, and purchasing. Better communication is needed among these departments on all facets of supplies for the hospital.

Administrators should take part to explain over-all hospital policies. Directors of nursing service should participate because central service is generally considered a department of nursing service and because the other nursing departments must work closely with central service. Nursing educators should be included, to show the course registrants how student nurses can be introduced to central service department operation.

Personnel specialists should be on the program, to present information to help enrollees understand how to handle people. Manufacturers in the hospital field should certainly be invited to participate. Many of them have specialists on their staffs who are well qualified to give advice on technical problems.

This proposed postgraduate course should be divided into lecture periods and "laboratory" or practice periods, in which the enrollees would get a chance to practice what had been taught.

Q. Should a central service supervisor have some participation in purchasing?

A. I think she should have some participation — either directly or in an advisory capacity — in the purchase of supplies and patient-care equipment to be used in the hospital. Her recommendations should be weighed very carefully because she is the person who sees the supplies and handles them day in and day out.

Probably the safest way to handle the problem of purchasing would be to establish an equipment and supply committee which would meet once a month or whenever necessary to discuss the problem of equipment and supplies throughout the hospital, and to decide what equipment should be added or discarded in order to improve patient care and the over-all efficiency of the hospital. The committee should include the administrator, the director of nurses, the purchasing agent, and supervisors or directors in charge of departments. Among those, of course, would be both the central service supervisor and the operating-room supervisor.

With purchasing decisions handled by such a committee, everybody should feel that he had a part — that no one person was the whole show. A lot of personnel difficulties might be avoided if the problem were handled this way.

Q. You've indicated that you think the central service supervisor should be a nurse. Do you then consider central service a nursing department? Should the supervisor report to the director of nurses or to the administrator?

A. Central service in large hospitals is a large enough area that I feel it should be considered a separate department, especially when it is responsible for the supplies throughout the hospital — in the outpatient clinics, the emergency department, perhaps research departments — as well as supplies on the floors.

It should be considered a department of nursing service, and the person in charge should report her daily activities to the director of nursing service, so that the director is aware of what is going on in one of her departments.

However, I think there should also be good communication between the supervisor and the administrator. A director of nursing is so involved in the over-all nursing activity within the hospital that she does not have the time nor the energy to devote to learning the tiniest details of every aspect of nursing service. When the time comes to discuss a specific area with the administrator, I think she would be wise to ask the person in charge of that area to come in and discuss it. Certainly that person is better able to provide accurate information.

Time should be set aside for meetings of the administrator, the director of nursing service, and the central service supervisor. Two or three times a year, or oftener if necessary, these people should sit down and discuss the various needs and problems of nursing service, equipment problems, budgets, the demands made by physicians, and other problems.

The administrator becomes aware of central service problems and thus can try to find a solution for them. He also has an opportunity to explain to them the problems of the administration — he can give them information on the economy of the hospital; can tell them whether things they believe desirable are possible at that time or whether something else must be done for the time being.

If others in the hospital don't understand the purpose and functions of central service and the

total picture of hospital operation and patient care – if the supervisor can't sit down with the administrator and show him what she is doing for the hospital, and with the director of nursing to show her the efforts being made to help her staff – if the supervisor can't communicate, she is butting her head against a stone wall.

Q. What is the future of central service, and of the nurse in central service?

A. I think central service is here to stay, if that's what you mean. Regarding changes in operation which the future may bring, I think technics will become simpler. Time, energy, and motion of persons involved in central service will be put to better use as a result of the introduction of more and more disposables, better packaging, and other improvements in commercially available supplies.

Greater use of disposable, presterilized items will probably reduce the number of employees needed in the central service department, but at the same time it will probably increase the efficiency of the department. Hospitals will still need a central area for the dispensing of supplies.

Personnel who are in the area will be working on the preparation of more complicated, special supplies that are not adaptable to commercial preparation.

The supervisor's knowledge of nursing care will be perhaps even more important, because it will make her better qualified to assist members of the professional staff to meet the increasingly complex needs of good patient care in tomorrow's hospital.

*10 'Do's and Don'ts' in Loading a Bulk Steam Sterilizer**

1. DON'T . . . let material being sterilized touch any interior surface of sterilizer chamber.

Impingement of material on chamber surfaces prevents circulation of steam to that area, thus causing "hot spots." Dry heat at the "hot spot" may cause immediate damage to the chamber contents and will most certainly result in accelerated deterioration of most fabrics. In addition, recommended cycle times are based upon the assumption that the entire chamber contents are in contact with steam. Theoretically, sterility of a dry "hot spot" could not be assumed.

2. DO . . . provide adequate space for circulation of steam around material being sterilized.

Recommended cycle time is based upon the assumption that the entire contents of the sterilizer come in contact with steam. If no clearance is allowed between packages, steam may not reach all areas, and the conditions necessary for sterilization will not exist throughout the chamber.

3. DON'T . . . allow flasks containing liquids to touch each other. A "hot spot" can develop at the point of contact, causing the vessel to crack with consequent loss of the contents —as well as the vessel itself.

4. DO . . . place covered containers on their sides with covers ajar.

Steam enters the sterilizer at the rear of the chamber and rises to the top. Cold air is forced downward and forward and is gradually dispelled at the front-bottom of the chamber. Containers resting in a normal upright position can retain air pockets and thus undergo a complete cycle without being subjected to the conditions necessary for sterilization. When containers are placed on their sides with covers ajar, air is forced to spill out as the steam gradually fills the chamber.

5. DON'T . . . wrap packages too tightly.

There are a number of acceptable wrapping materials that allow proper penetration of steam; however, caution must be exercised to prevent overly tight wrapping of packages. This is often done with the misguided notion of saving space. Packs for normal sterilizing cycles should be limited to a maximum of 12 x 12 x 20" and be packed loosely enough to facilitate passage of steam through the bundle.

6. DO . . . place packs so that folds are in a vertical position to facilitate penetration of steam and expulsion of air.

Each layer of fabric in a horizontally folded pack resists the downward passage of air through the pack. This is especially true if the fabric is tightly woven. Whenever possible, therefore, the pack should be placed with the folds running in a vertical position.

7. DO . . . wrap gloves correctly and place packages on edge with thumbs up.

Steam must penetrate to all glove surfaces. It is therefore necessary that impingement of surfaces be avoided. A layer of muslin should therefore be used between adjacent surfaces wherever possible, i.e., in the palm and in the cuff fold. A "billfold" type cover with individual pockets for each glove should be used.

After preparation it is of utmost importance that gloves be placed in the chamber correctly. Here the problem is not only one of penetration but also of effective removal of residual air from the fingers. Proper stacking will assure that air will spill out due to gravitation.

8. DON'T . . . use a basin or tray with a solid bottom that will trap air when sterilizing instruments.

The desired procedure is to use a tray with a wire mesh or perforated bottom and to place a layer of muslin in the bottom of the tray.

9. DO . . . open or unlock all jointed instruments.

Steam must contact all surfaces as soon as possible.

10. DON'T . . . ever oil instruments that are to undergo steam sterilization.

Even a minute amount of oil on a surface will prevent necessary steam contact. In addition, oil in joints tends to hold dirt and foreign matter.

*This material is taken from a news release issued by the Wilmot Castle Co.

Our Trash Problems Are In The Bag——

By L. Brent Goates*

With the increasing use of disposable items in the hospital, effective methods of handling trash disposal are of interest to every hospital department. Unsightly litter creates an unfavorable impression on both patients and employees. It may also be a reservoir for infection.

The author describes a method utilizing disposable polyethylene bags as liners for trash cans, and a special chute for burnable trash. Whether or not a hospital has such a chute, many of the ideas advanced by Mr. Goates could easily be adopted.

We suggest that this material be called to the attention of the administrator and the executive housekeeper.—THE EDITORS.

● Perhaps there is no introspection quite like that associated with planning a new facility, where each question that bears on a given

*Assistant administrator at the Latter-day Saints' Hospital, Salt Lake City, Utah.

Housekeeping assistant lifts burnable rubbish, intact in polyethylene bag, from container for deposit in gravity chute leading to incinerator. Refuse had not come in contact with its porcelain container, which was then refitted with another disposable polyethylene insert. Note first step, where bag is bound with plastic-covered wire to keep its contents intact.

procedure must be minutely examined. It was the new construction at Latter-day Saints Hospital which stimulated the current method of handling burnable rubbish at this hospital.

Disposal of rubbish is a problem for any large institution. In the hospital field, where sanitation standards are at their highest and recent discoveries have accented the need for preventing infection, only the best methods should be employed.

A review of Latter-day Saints' former method showed that much improvement was required. It had, for instance, been customary to have a housekeeping worker make rounds pushing a large cart upon which were several large, unsightly garbage cans of the galvanized variety.

Care was taken to line these cans with newspapers, but this was an operation which required some 10 minutes per can for an ambitious worker, and more commonly 30 minutes for the average employee who found the columns of the old papers of immense entertainment. The procession was never a welcome sight anywhere in the hospital, and especially on the crowded elevators, which, unfortunately, before the new wing was added, were also used for the transportation of patients.

When planning the new wing which is built across the middle of the hospital, the architects and consultants provided a gravity chute for disposal of burnable rubbish. A new incinerator in the lowest level of the hospital would consume the trash. It remained for the administration to solve the "burning" problem of: "How should the rubbish reach the incinerator?"

Originally, it was thought that the rubbish could be just thrown down the chute and a water spraying system would be installed inside to keep it clean. But a few m e s s y experiments, including gathering the rubbish from the sorting table in the incinerator room, quickly demonstrated the need for a neater method of delivering refuse.

Through the ingenuity of John R. Jefferies, assistant administrator charged with the supervision of the Housekeeping Department, the possible use of bagged rubbish was explored. The container, to meet the need, must be cheap enough to be diposable and yet strong enough to withstand the trip and its abrupt ending, without breakage or spillage. Another specification was concerned with size, because the chute curves downward and the passage would not accommodate too large a bag.

The answer came in a #1001 polyethylene bag which is made to order by the Chippewa Plastics, Inc., Chippewa Falls, Wisconsin. This bag is 26″ x 40″ and is packaged by Tower Packing Company of Skokie, Illinois, in quantity of 2500 to the carton. The cost is only six cents per bag and thus far it has met all the tests on application and durability, with some common sense modifications in handling.

With this problem solved, an improved over-all system for disposal of burnable rubbish was devised:

It was discovered that the new plastic bags could be made to fit the 14-inch-square opening of a new porcelain garbage container, and when the swinging lid on the upper end of the can was removed the design suited perfectly. (These cans are now ordered by special purchase without the swinging lids and their associated hooks, at a saving of one-third the total price.)

The plastic bag is inserted, and its edges folded over the top of the can, overlapping about two inches. This innovation has been highly praised because it not only enhances the general appearance of the hospital corridors by eliminating the old galvanized garbage cans, but it also provides a standard of cleanliness and odor prevention never before possible. Now, the trash never comes into contact with the container.

At Latter-day Saints Hospital the procedure for gathering the burnable rubbish is as follows:

Chute openings leading to the incinerator room are available on each of the six floors of the hospital, located in the new central wing. Housekeeping personnel working on the east and west wings of the hospital carry their sealed bags to the chute openings in the central wing where the bags are dropped to the incinerator room.

Twice daily, rounds are made to less convenient areas. The worker making these rounds for pick up, like any other who handles the refuse, ties each bag with a plastic covered wire. He then rebags each porcelain container, which always stays clean because of its polyethylene insert.

A special cart has been built for this job. It features a washable canvas lid which fits snugly over the top of the containers and thus provides a double seal (since all refuse is bagged) against odors, dirt, and air-borne contamination.

Quite naturally, there were some interesting and special problems to be solved in the implementation of such a system. Surgery posed certain problems since it was important to c a u t i o n personnel against discarding needles which would puncture the plastic bags. The heavily soiled surgical dressings were a worry, too, until it was learned that double bagging would provide extra protection against breakage.

The educational work among surgery employees may have been too effective. They were so strenuously warned about placing glass or other breakable rubbish into the bags that they became overly cautious. Rather than risk error, they commenced sending all trash out in bulk, ignoring the segregation of burnable rubbish and the newly designed bagged system via chute to the incinerator. Then followed more moderate instruction, urging surgery personnel to do their best in eliminating the unbreakable and unburnable items. Since then, the program has worked most satisfactorily, especially when small containers were placed alongside the bags to receive the needles and other sharps.

It should be stressed that the system depends in some measure on the proper type of modern incineration and the trained personnel to make it work to its intended efficiency.

At Latter-day Saints Hospital the new installation was a Morse-Bolger incinerator, which employs a gas destructor flame at extra hot temperatures. This type of incinerator has a shelf on which to place wet items, such as pathologic tissues, to dry out before they are cremated. An auxiliary burner which impinges on the pathological hearth, assists in solving this, another of the hospital's disposal problems.

A trained worker in the incinerator room is essential. At Latter-day Saints Hospital this man is instructed never to stand directly under the chute opening. He is required to wear clean, white canvas gloves and a face mask when firing the furnace. The bags drop from the opening only six steps from the incinerator door and are light in weight, so lifting is never a problem.

Many complimentary comments have been made about this disposal program, including several from members of the medical staff. A considerable advantage of the system is that it is quite simple and easily installed. The results were found well worth the effort and expense.

Burnable rubbish from all areas of the hospital arrives via chute to incinerator room where clean, rapid disposal is simplified by use of plastic bags.

CSR Planners Review Efficiency Of Department They Designed

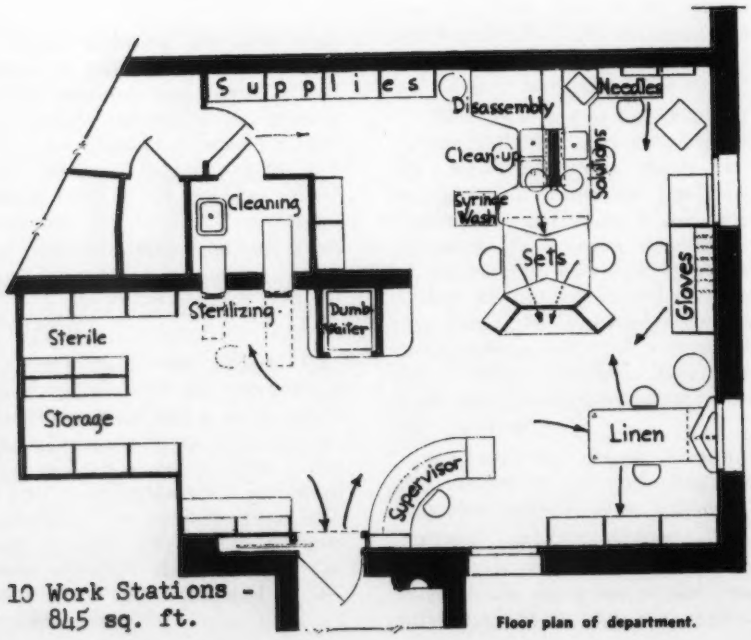
When Boston architect Frederick E. Markus became interested in central service department planning, he studied many departments to determine the requirements of an efficient one. He found many mistakes in planning and many inefficient methods.

Mr. Markus, with the collaboration of Mrs. Jean Christie, then began planning a department which would enable maximum efficiency in work flow and employee functioning. The first department based on their research was set up at the Free Hospital for Women, Brookline, Mass., and was described in a series of articles in HOSPITAL TOPICS in 1956.

How has the Markus-Christie planning stood the test of daily use of the department? And how well did it survive a change of supervisors?

Three persons answer these questions: Mr. Markus and Mrs. Christie, and Mrs. Christie's successor as supervisor, Evelyn Trabach.—THE EDITORS.

By Frederick E. Markus*



Floor plan of department.

As specialists in hospital design, Markus & Nocka had long been aware that no one knew or had taken the trouble to investigate the requirements for producing an efficient central supply department.

It was also obvious that to successfully carry out such a study a collaborator would be required who was thoroughly familiar with the what, why and how of central supply work and had had some training in methods engineering or work simplification. Mrs. Jean Christie was the answer to our need.

The study took a year and a half. The first few months were devoted to visiting central supply departments in various hospitals. This gave us a good background and perspective. It also gave us a long list of quite obvious errors

*Frederick E. Markus is a partner in the Boston firm of Markus & Nocka, architects, engineers and consultants for medical facilities. Mrs. Christie (formerly supervisor of central service, Free Hospital for Women, Brookline, Mass.) is director of surgical services, St. Margaret's Hospital, Boston. Miss Trabach is supervisor, central service department, Free Hospital for Women.

in planning and what made for poor working conditions. The most prevailing ones were summarized in an article published in the December, 1955, issue of HOSPITAL TOPICS and later reproduced in Volume I of the *Central Supply Yearbook*.

However, there were worthwhile positive aspects to these trips. There was, first of all, the opportunity for an interchange of ideas with a large number of central supply supervisors. While the value of such interchanges cannot always be pinpointed, their potential worth must not be underestimated.

Also during these inspection trips, certain workers were noted who had developed a remarkably high degree of efficiency in a particular type of work. Arrangements were made to have one of our employees, trained in time and motion study, spend a day with each of these to observe, time and record their various activities.

Of special importance was the accurate recording of the space required to perform various tasks. These observations furnished us with very important data for the proper design of work stations. (The space actually available in many cases was inadequate.)

Having a record of what motions were involved gave us a basis for improvements in work-station design to get the benefit of work simplification. For example, where a pair of shears was kept in a drawer — which meant that the steps involved were "open drawer — take out shears — use — return shears — close drawer" — we arranged to have the shears pre-positioned for immediate use.

Another common problem — to get string to where it was wanted — often involved the employee's getting up and taking a short walk. The illustrations show how easily this problem was solved in several locations.

The layout of the department as a whole was based on line production technics now universal in industry. The reason for the extensive use of line production in industry is purely economic. Where the process for producing a product or service can be reorganized for line production, the time savings are, as a rule, very substantial.

Inasmuch as Markus & Nocka had on their research staff industrial engineers, one of whom had specialized in line production, expert help was available for this aspect of our problem.

The work of a central supply department is of such a bewildering variety that any serious effort by an unaided lone planner would soon end in utter frustration. Here Mrs. Christie's years of experience, supplemented by her specialized studies at Boston University, paid off.

By Jean E. Christie, R.N.

It is with great pleasure that I begin my part of the review of the central service research project at the Free Hospital for Women. It is satisfying to know that one has had a part in contributing actual help to the countless visitors. I would be slightly inhuman if I denied enjoying the international mail which came to my desk concerning this project.

But most of all, I am grateful to have derived the great benefit from participating in such a tremendous learning experience. What this project has done to sharpen my observation, to discipline my thoughts, to widen my horizons, and to improve my abilities, will always be of inestimable value to me.

It is no easy situation when one is faced with the knowledge that the responsibility for proving the actual working benefits of such a design is entirely yours. And, entirely apart from the design itself, there were problems of another nature.

Personnel turnover in this hospital was low. One of the head nurses had been in her job for 26 years, and the newest head nurse had already served five years. Only two nurses on the entire nursing service had ever had any previous experience with any sort of centralized supply system!

Good communications were obviously a vital necessity, and communicate I did, with visits to head nurse meetings, displays of products to be used, conferences and endless conversations with anyone and everyone willing to listen!

Prior to the opening, each department received a typewritten bulletin explaining again the basic fundamentals, and giving a complete timetable for scheduled pick-up and delivery of supplies for each hospital department. Standard quotas had been determined and the requisition system had been established. Two workers had been with me for a few weeks, being oriented and learning a few basic procedures in the existent working facilities of the hospital.

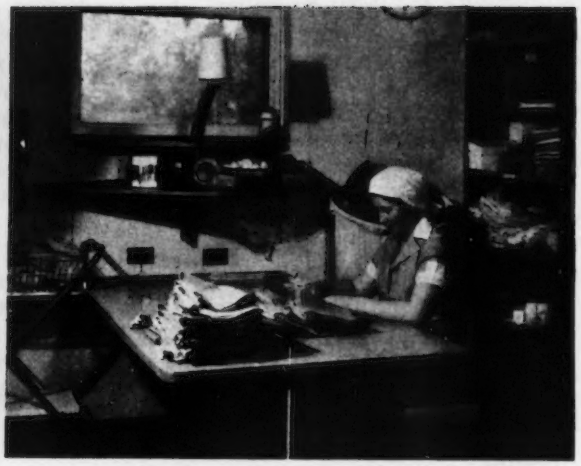
Then communications of a different sort reached me. Due to many factors beyond anyone's control, surgery would have to move into its new quarters on a certain date, without any facilities for general autoclaving. Central service would have to open about a week before its completion date! And move in we did, with the painters, and without much of our equipment installed.

Never have I been so grateful for specifically designed work stations as I was during those first few days. Every job had to be taught to every worker. And with precisely designed work units, I could teach not only the job, but good work habits as well.

The stations didn't need the usual preparation that a plain work counter does; so we wasted no time or motion in setting up for any job. Because all necessary supplies were stored in the area where they were to be used, no time was wasted in the "get ready" process. Because stations were always left ready for use, no time was wasted in "putting away" for any job, as there is when one uses a plain counter and has to clear this counter space to do some other work.

So setting-up and putting-away time were almost entirely eliminated, and I could spend my teaching time concentrating on the actual performance of the job itself.

The design of the stations actually taught the worker how to



Above, left: Disassembly and cleanup area with mechanical syringe washer at right. This station begins the series of continuous operations which are in line, producing the simplest possible flow pattern. The number of such lines would be two for the smaller hospitals — increasing to a maximum of six lines of several positions each. In the latter case the disassembly and cleanup unit would be a double unit to accommodate two or three operators. In picture at right, employee is seated at hi-lo linen folding table. For the folding of large sheets — a procedure for which employees prefer to stand — the "hi" position is used. The specially designed wall-mounted linen hamper (now available as stock) is for rejects needing mending. The V-shaped shelves hold items which usually were kept in a drawer or two. The string dispenser is another refinement developed in the architect's model shop.

work simply and without wasted motion. Although every worker learned the jobs of the entire department, each was eventually assigned to specific tasks on a specific schedule, and each therefore soon began to develop the speed of an accomplished worker of long practice.

Each worker knew that her specific schedule was geared to the available autoclaving time, and moved into the pattern of having certain items ready at set intervals so that there was always a load ready for autoclaving as soon as the autoclave was ready to take it.

Since the autoclave keyed the schedule, the worker whose task might be lighter than usual moved in to help any worker whose task might be heavier than usual, and good teamwork was firmly established.

Just as the autoclave had keyed the workers' schedule, so had it keyed the schedule for departmental pick-up and delivery. Surgery learned that if the used supplies did not arrive at central service at a definite time, the department would have to work overtime to process them, and such supplies would then be delivered too late to be put away.

Surgery was a busy place, and the need to put supplies away in the morning was a definite hindrance to its efficiency. The result was that the surgery personnel got their supplies to us on time for our last loading, giving us time to process, autoclave, and deliver these supplies back to the waiting hands of the afternoon crew.

Orientation tours for nursing personnel were conducted in the department, and our need for adhering to a strict schedule was emphasized. Our central service aides made it a strict point to appear on the wards at the same time, day in and day out, and the wards were ready.

One other point heavily emphasized in orientation tours was the need to control supplies. We had analyzed the cost of every item we supplied. We therefore needed accurate records of every supply delivered to every department, and also needed a charge slip to balance out the items delivered on direct patient charge.

At the end of each month, we delivered to the business office a tally sheet for each department which showed the exact number of each item delivered to the department, and the exact cost for each of these items. The patient charge slips were, of course, delivered daily. Only in this way could we show the use we had made of the types, amounts and costs of supplies which we had requisitioned during the month.

If I were asked to name the feature which had been most helpful to me, I would surely choose the shape and the perfect location of my desk. It was semicircular, ideal for teaching work simplification. It could serve several jobs, or be used by two or three people at the same time. The shelf built at the back of the arc held the requisitions and occasional items which usually clutter a supervisor's desk.

But most important was its placement. From this vantage point, no matter how deeply engrossed I was in work or in conversation, I could check the progress of every worker by lifting my eyes and turning my head. From this same vantage point I could watch the work methods of each worker, make suggestions, observe needs, call out messages, or do anything the occasion required without leaving my chair.

How different my situation was from that of the supervisor who must run in and out of rooms, or be unable to watch the work progress because there are so many walls in the way! She must decide when to work and when to walk, and what proportion of her supervisory time she should spend in each area. On the other hand, I could be as much apart from or as much a part of my group as desired at any given moment. As one visiting administrator put it,

Above, left: This is a first attempt to develop a self-ventilating glove-processing unit. Powder dust is drawn both up through a hood and down through a screen in the counter. The blower is in an adjacent storage room with filtered exhaust to the outdoors. A superior, completely self-contained unit is now available as a stock item. In the background is the one and only foot-operated device in the department—a two-hand needle-packaging machine conceived and developed by Mrs. Christie. Mechanical parts were produced partly in the hospital maintenance shop and partly in the architect's model shop.

At right: The supervisor's station has been found far more versatile and efficient than any type of desk then available. It is so placed that from it she has a visual sweep over the entire department, from receiving to issuing. Mrs. Christie made several additions which might warrant consideration as standard built-in details. The adjustable upholstered chair, which is standard for all operators, is more comfortable than wood or stamped metal stools, and comes in a variety of bright colors.

this was true supervision — the process of looking over versus the usual overlooking.

I mentioned my love of my desk to a visiting "nurse consultant" one day and was stunned to hear her reply that the shape of the desk was a mere art form, and that if I had properly trained my workers, I would not need to watch them. I had never viewed a central service as a mere assortment of tasks to be done; I had always considered it a workshop where a group of human beings, working as a team, accomplish a necessary service, and where teaching and supervision complement each other. That either one could replace the other seemed impossible.

Judging from the fact that there was no turnover in the personnel of my crew, that upsets in human relations were few and far between, that the entire team worked with high efficiency, excellent teamwork, and had obvious pride in their service, I still believe that human relations handling is a vital factor.

Then the blow fell. The rumor came back to us that several architects and designers of central service departments were saying that "the Free Hospital central service works only because Mrs. Christie is there."

There was one good way to disprove this. In September, 1957, I turned the reins of the department over to a staff nurse from the outpatient department who had had no previous experience in central service. She had had the equivalent of about two weeks orientation and training with me. Her account of her experiences and her opinions follows.

By Evelyn Trabach, R.N.

The Free Hospital central service is the first of the prototype developed as a joint research project by Mr. Markus and Mrs. Christie. I was formerly connected with the outpatient department and took over central service in a hospital that originally had no such department.

This would presumably give me no basis of comparison with conventional norms. Nevertheless, I have acquired some definite opinions and have a basis for comparison coming mainly from two sources.

First, there have been and still are many visitors — administrators, architects, consultants, and mostly, of course, other central service supervisors. They come from far and wide, a few from foreign countries. They have been very favorably impressed, primarily by the greatly simplified flow of all work and the efficiency and flexibility of work stations.

Second, I became very curious about all this admiration and couldn't help asking myself, "If this is good—what is not good?" I therefore arranged a series of return visits when convenient to find out about the facilities with which some of these visiting supervisors worked. I was in for many surprises.

There is, of course, or should be, a similarity of work in all central service departments. Despite this fact, there seemed to be no two departments with any major points of similarity in concept, except for the work of autoclaving. One would have thought that the similarity of work would have produced some recognizable flow pattern, but no such pattern was evident.

Indeed, work was all too often being performed under most unfavorable conditions at locations having no recognizable flow patterns because of adversely built-in facilities and other fixed limitations. It is quite usual to find a profusion of stainless steel counters with cupboards or shelves below, serving no particular purpose — often actually quite empty.

Because of the lack of knee space in several places, women were sitting "side-saddle" at some of these counters to perform the various tasks required. I actually saw instances of such poor planning that the aides preferred to sit on top of the counters and work with their feet dangling in space.

Invariably, there was much waste of linen: towels, sheets, wrappers, pillow cases, and even blankets were being used to cover the stainless steel to make a more satisfactory working surface. Stainless steel, despite its durability, is a cold, hard and glaring surface. There is no doubt in my mind that few work stations warrant it.

It also seemed obvious to me that the planners of these departments had not the vaguest idea as to what precisely is done in such a department. To be sure, some obvious things like sinks, counters, and sterilizers were provided – but nothing that made the place specifically an efficient workshop for central supply. Open areas were filled with tables, often without any reference to specific need.

Finally, what would make these departments frustrating to me was not their inefficiency but their very permanency as evidenced in fixed partitions, tile work, terrazzo, and stainless steel.

By contrast, my department is designed for flexibility, and almost every station could be fairly easily changed to meet any new requirement. We constantly take on new responsibilities, investigate new materials and new technics. The flexibility which was part of the original scheme of things is certainly paying off, for we have already made changes, minor to be sure, but easily accomplished and always adding a bit more to the over-all efficiency.

We have a maximum of five persons rotating among 14 work stations. This leads to an interesting question: What might the overall capacity of the department actually be? The sterilizers are now used to about 60 percent of their capacity on a time basis. With increased supplies coming in, it is possible, but not probable, that congestion of any given area might be a factor.

It can be safely assumed, however, that worker efficiency would increase with larger volumes of similar work items. It is my belief that we could service 200 beds with our present facilities with the addition of no more than two people to our staff. [*The hospital now has 90 beds.–ED.*]

Because of the convenient and efficient work stations, and the operational system which Mrs. Christie developed, the training of new employees is greatly simplified. In the aide-training program of our hospital, the new aide spends one week in central service, being introduced simultaneously to hospital terminology and technics.

She is taught to identify supplies and learns where they are used and why. She accompanies the pick-up and delivery system daily, so that she learns where items are kept, and the entire system of supplying.

After being taught the basic rudiments of every task in the department, she departs for her assigned place of employment, far wiser about the ways and the workings of a hospital. With such a system, errors are very rare and interdepartmental relationships are excellent.

I count myself fortunate that my first experience in central service has been in this particular department. Many of our visitors have commented on its "smooth operation." It is my belief that this comes from having every task planned and every station planned for the tasks to be done there. With Mr. Markus and Mrs. Christie having so carefully established the work flow, my task is made easy –I just let it flow.

Below, left: These two stations follow cleanup. As work stations they are extremely flexible and versatile. The entire unit is easily detached, altered, or removed for a substitute, if need be. The string dispensers and card formulary are refinements developed and added as the department got under way. Mrs. Christie at that time inaugurated via the bulletin a weekly challenge for improvement in some operation or method.

At right: A special truck was designed for routine deliveries. This was the department's own contribution and was held in abeyance until the routine was fairly well established.

Thermo-Plastics in Patient Care Devices

By William P. Murphy, Jr., M.D.*

Plastics are man-made materials synthesized from the basic elements by the ingenuity of the chemist, for the explicit purpose of producing qualities and economies of fabrication not available in natural materials.

The compounding of *intermediates* available in this group yields literally thousands of new materials yearly, each with properties to suit a particular situation. While of great value to the consumer, the variety of properties also serves to confuse, for each material must be treated a little differently to insure success in its own area of usefulness.

Plastics are being used in a variety of places in the hospital: as flooring, counter tops, mop buckets, tableware, tumblers, hose, pens and countless other general items. These articles are used in the hospital, but are generally not processed there.

On the other hand, the plastics used in patient care devices are often modified, processed or sterilized in the hospital work rooms, and it is with these items that we are concerned here.

Plastics have been used in patient care items because of their desirable properties, which can include low cost, light weight, warmth to the touch, transparency, ease of fabrication, and stability during sterilization. It is also possible to combine these properties and yet make a family of items which may be disposed of after one use.

For those which are not disposable, however, stability during sterilization and/or a suitable method of sterilization becomes most important. Sterility is commonly required of patient care devices, and its accomplishment is often detrimental to the material in question.

For example, some of the polyethylenes, polystyrene, and the methacrylates will deform if they are autoclaved so they must be sterilized by other means. It is therefore useful to be able to recognize materials and thereby know the property limitations with which one is dealing.

In the following paragraphs the plastics most commonly used in patient care devices will be discussed. Bear in mind that specific compounding may cause minor variations in properties. All of the materials discussed here are of the thermo-*plastic* family, that is those which soften when heated and again harden when cooled.

In contrast, the thermo-*setting* materials soften only once under heat – which causes internal chemical changes making them hard and impervious to further applications of heat up to the charring point. The charring point ranges upwards of 250° F. Because they are all rigid, these materials are less versatile and are used less in direct patient care. They will not be discussed in detail.

(The thermo-plastic and thermo-setting plastics are listed in Figure 1 with some of the trade names under which they are sold.)

POLYETHYLENE is a low cost homogenous flexible plastic used commonly in sheet as well as molded form. It is now available in two general forms designated as high density and low density.

Confusion has arisen because the high density material is produced by a low pressure polymerization process, whereas the low density material is made by a high pressure method. Since we are concerned only with the material itself, it is best described as Hi-D (high density – sp. gr. 0.96) and Lo-D (low density – sp. gr. 0.92). Intermediate materials are also available.

The *low density* material was the first developed, and is a grayish white translucent plastic with a wax-like external appearance. Its surface is often slightly irregular, and the material is highly flexible and stretches considerably before breaking.

Lo-D will not stand autoclaving and must be sterilized by gas or immersion in sterilizing fluids. It is commonly used in sheet form, for moisture protection or for wrapping sterile items. It is also used for needle covers in syringes, for airways, and in plastic caps for medicine vials. When extruded into tubing it is slightly stiffer than the vinyls and therefore it is suited for use in intravenous cannulas.

High-density polyethylene is a recent development and is, as its name implies, more dense and therefore less transparent. Its color is more milky although sometimes it has a slightly yellowish cast Because of its low cost and ease of molding, coupled with high temperature charaeteristics, it is being used for such hospital items as

*President of the Cordis Corp., research associate professor at the Miami (Fla.) School of Medicine, and research associate of the Miami Heart Institute.

nursing bottles, medicine glasses, tumblers, bed pans, syringes, suction tips and so forth.

The polyethylenes tend to be non-irritating to tissues and therefore are desirable in hospital usage. The Hi-D polyethylenes have not been used extensively for internal implantations but it is likely that they will be after experience in the handling of these substances is gained.

The polyethylenes are joined together only by heat, no common cements being available which will join them satisfactorily.

POLYVINYL is a family covering a wide variety of properties. The vinyls are made up of a basic resin, a plasticizer which softens, a stabilizer which gives long life, and a dye which gives the proper color. Waxes and oils are often included to assist in the extrusion or molding of the material as used.

Almost any flexibility or softness may be obtained and the vinyls may be had in as rigid a form as desired; however, rigid vinyls are opaque and lose their temperature stability.

Vinyls have the advantage of being obtainable in a form at once transparent and flexible, which is desirable in many medical applications; and in their flexible form most vinyl compounds will not seriously deteriorate with one or two autoclavings.

Rigid vinyls are not commonly seen in hospital practice although they are used in some intravenous recipient sets as the rigid ends on the drip chamber, because they may be readily cemented to both the flexible vinyls which sometimes make up the body of the drip chamber and the flexible tubing going to the patient.

Common application of the vinyls in patient care devices include intravenous tubing, catheters of many varieties and larger tubes used to conduct sterile water, etc., in laboratory or supply areas. These tubes are valuable because they are low in cost, transparent, and may be autoclaved to achieve sterilization.

The vinyls may be joined by cementing and an excellent bond is obtained; both rigid and flexible materials can be joined with equal security.

The versatility of the vinyls is in itself something of a drawback, for the variety of properties is the result of compounding many substances. Unfortunately some of these ingredients may be leeched out into solutions passing through the plastic, or coming in contact with it, and these in turn may be toxic to the patient exposed.

It is therefore necessary to select vinyls which have been found compatible with the body and/or the drugs which make contact. Most commercially available products have complied with these requirements.

POLYAMID (Nylon) is a term applied to a number of compounds which are generally opaque, slightly yellowish, high temperature, tough, sturdy substances.

The polyamids, or nylons as they are termed now generically, withstand autoclaving readily and are used for many places where abrasion resistance, toughness and strength are required. They have been used in containers, needle hubs, syringes, some medical instruments, bed pans, tableware and tracheotomy tubes.

Nylons tend to be slightly more expensive than other plastics and have only slightly better properties than the new high density polyethylenes.

A disadvantage of the nylons is that they yellow and become dirty in appearance on aging, and they absorb moderate amounts of moisture up to 3 percent and swell in the process. This swelling is a disadvantage when the material is used for a close fit with another material.

Under ordinary circumstances nylon cannot be joined to other materials by cementing. It does not heat-seal without embrittlement, and therefore must be affixed to other materials by pressure or by metallic fastenings.

ACRYLICS are materials which are highly transparent and commonly used in medical practice. They mold well and produce attractive products although these products are often slightly brittle and do not withstand autoclaving temperatures without distortion. Sterilization may be accomplished by gas or by soaking in sterilizing solutions.

Acrylics are available in large sections and therefore may be readily machined into a variety of shapes and cemented together. They are light weight, have low water vapor diffusion, and weather well. They are commonly seen in the hospital in prosthetic devices for implantation, as parts of speculums, as probes and as light conducting heads for instruments, and in extracorporeal organs.

The acrylics may be cemented with strong clear joints and the material is readily available in rod, tube, sheet and block form for fabrication of such equipment as heart lung machines, artificial kidneys, and so on.

STYRENE is a plastic which is stable and has excellent electrical characteristics as well as being very low in cost. It is readily molded and commonly used for disposable hospital products including needle hubs, syringes, medicine glasses, needle covers and containers of many varieties.

The material is transparent and stable over moderate periods of time, but unfortunately it tends to craze easily and may even crack over longer periods.

It has a low softening point and cannot be sterilized by autoclaving, but must be subjected to gas or fluid sterilization. Although tough forms are made, polystyrene tends to be brittle.

CELLULOSE PLASTICS are most often seen in the hospital in the form of cellulose acetate or cellulose buterate acetate. They are used in sheet form or may be injection molded or extruded. They are basically low temperature, transparent, glossy materials which are low in cost and readily used.

They tend to have a slightly sweetish odor and therefore are not the most desirable materials for medical usage.

The cellulose materials are slightly flexible and tend to be tough. Their weather resistance is poor

and they are attacked by a number of solvents. They may, however, be heat-sealed or cemented for purposes of adhesion.

They are more often used for protective coverings for various items and are not commonly used for tissue implantation because of their reactivity.

FLUOROETHYLENE is a material which offers many advantages in medical practice. It is resistant to very high temperatures and generally very inert chemically. It tends to be dense, heavy, slightly soft, and of a gray-white or milk-white color. The surface has a slightly soapy feel and abrades with difficulty.

Temperature resistance is in the neighborhood of 400° Fahrenheit, and the various fluoroethylene materials are extremely resistant to the action of solvents or other chemicals. While inert at normal temperatures, they tend to break down at temperatures above 480° F. to form toxic gases. Care should be taken in their handling if this temperature is anticipated.

The fluoroethylenes are difficult to mold but may be extruded or machined readily. They are excellent insulators and are frequently found where electrical or chemical resistance is required.

They are rarely seen in hospital practice but will become more common as the price is reduced.

The fluoroethylenes are almost impossible to cement under ordinary circumstances, although special cements and technics have been developed.

Sterilization is readily accomplished by autoclaving with little or no change in physical dimension, and no absorption of water. Most common hospital usage at the present time is in suture containers and insulators for surgical electrical cutting devices, etc.

Comparative properties of the various thermo-plastics are set forth in Figure 2 in tabular form.

This, as previously mentioned, is but a small number of the potential compounds and it is recommended that more extensive literature be sought if further details are needed. Highly recommended for this purpose is a text titled *A Ready Reference for Plastics* published by the Boonton Molding Company of Boonton, New Jersey. This text may be purchased for a small fee and is a desirable asset to any central supply room commonly handling plastic materials.

Figure 1

Trade Names of Commonly Used Plastics*

THERMOPLASTICS

Polyethylene	
Alathon	DuPont de Nemours & Company, Wilmington 98, Delaware
Marlex	Phillips Chemical Company, Bartlesville, Oklahoma
Dylan	Koppers Company, Inc., Pittsburgh 19, Pennsylvania
Polyvinyl	
Tygon	U. S. Stoneware Company, Akron 9, Ohio
Geon	Goodrich Chemical Company, Cleveland 15, Ohio
Agilide	American Agile Corporation, Maple Heights, Ohio
Polyamide (Nylon)	
Zytel	DuPont de Nemours & Company, Wilmington 98, Delaware
Nylatron	National Polymer Products, Inc., Reading, Pennsylvania
Gering NRW	Gering Products, Inc., Kenilworth, New Jersey
Acrylic	
Plexiglas	Rohm & Haas Company, Philadelphia 5, Pennsylvania
Lucite	DuPont de Nemours & Company, Wilmington 98, Delaware
Perspex	Imperial Chemical Ind. Ltd., London, S.W.I., England
Styrene	
Styron	Dow Chemical Company, Midland, Michigan
Lustrex	Monsanto Chemical Company, Springfield 2, Massachusetts
Dylene	Koppers Company, Inc., Pittsburgh 19, Pennsylvania
Cellulose	
Tenite butyrate	Eastman Chemical Products, Inc., Kingsport, Tenn.
Forticel	Celanese Corporation of America, Newark, New Jersey
Vuepak	Monsanto Chemical Company, Springfield 2, Mass.
Fluoroethylene	
Kel-F	Minnesota Mining & Mfg. Company, Jersey City, New Jersey
Fluoron	Stokes Molded Products, Trenton 4, New Jersey
Teflon	DuPont de Nemours & Company, Wilmington 98, Delaware

THERMO-SETTING PLASTICS

Phenolics	
Marblette	Marblette Corporation, Long Island City 1, New York
Resinox	Monsanto Chemical Company, Springfield 2, Massachusetts
Catalin	Catalin Corporation of America, New York 16, New York
Urea	
Alcylite	Loven Chemical of California, Newhall, California
Bettle	American Cyanamid Company, New York 20, New York
Sylplast	Sylvan Plastics Inc., Philadelphia, Pennsylvania
Melamine	
Melantine	Ciba Co., Inc., Fair Lawn, New Jersey
Resimere	Monsanto Chemical Company, Springfield 2, Mass.
Permelite	Melamine Plastics, Inc., Winona, Minnesota
Epoxy	
Devcon	Chemical Development Corp., Danvers, Mass.
Epocast	Furane Plastics Inc., Los Angeles 39, California
Ren	Ren Plastics Inc., Lansing 4, Michigan
Polyester	
Laminac	American Cyanamid Company, New York 20, New York
Paraplex	Rohm & Haas Company, Philadelphia 5, Pennsylvania
Atloc	Atlas Powder Company, Wilmington 99, Delaware

*These are only a few of the many trade names used. For a complete list see the Modern Plastics Encyclopedia, published by Plastics Catalog Corporation, Emmet Street, Bristol, Conn.

Figure 2

Characteristics of Commonly Used Plastics

Plastic	Polyethylene Hi-D	Polyethylene Lo-D	Polyvinyl	Polyamide (Nylon)	Acrylic	Styrene	Cellulose	Fluoroethylene
Appearance	White, opaque, glossy	Gray-white, translucent, irregular	Clear, slightly yellow, glossy	Opaque, wavy, glossy	Water clear, glossy	Water clear, glossy	Glossy, clear, slightly sweet odor	Opaque to white, soapy smooth
Resistance to continuous heat	250°F	212°F	255°F	270-300°F	140 - 160°F	150 - 170°F	140 - 220°F	390 - 500°F
Sterilized by	Autoclave	Soak or gas	Autoclave	Autoclave	Soak or gas	Soak or gas	Soak or gas	Autoclave
Transparency	Poor	Fair (thin sect. clear)	Good	Poor	Excellent	Excellent	Good	Translucent to opaque
Flexibility	Fair	Excellent	Excellent (Beware low temps.)	Stiff, but thin sections flexible	Rigid	Rigid	Stiff	Fair
Chemical stability	Good	Good	Fair (components leach or volatilize)	Good	Good	Good, excellent electrical insulator	Fair to poor	Excellent
General strength	Good	Fair	Excellent	Strong, tough	Hard, brittle	Hard, brittle	Fair	Fair to good
Effect of: Sunlight	Deteriorates	Deteriorates	Slight	Discolors	Slight	Yellows	Slight	None
Acids	Resistant	Resistant	Slight	Attacked by strong acids	Slight	None	Decomposes	None
Alkalies	Resistant	Resistant	Slight	Resistant	Slight	None	Decomposes	None
Organic solvents	Resistant	Soluble above 60°C	Resists alcohols, oils, aliphatic hydrocarbons	Resistant	Soluble in ketones, esters, aromatic hydrocarbons	Soluble in hydrocarbons	Soluble in ketones and esters	None
Water absorption	.01%	.01%	0.1 - 1.0%	0.5 - 3.0%	0.1 - 0.4%	0.03 - .1%	1.0 - 5.0%	0.00%
Cement	Heat	Heat	Cyclohexanone	None	Acetone, methyl acetate, benzene	Benzene, toluene	Acetone, ethylene dichloride	None
Used for	Baby bottles, urinals	Needle covers, sheetings, bags, airways, bottles, funnels	IV sets, flexible tubing, blood bags	Bedpans, stiff tubing, bristle brushes, handles	Dentures, drip chambers, medicine cups	Clear boxes, handles, tumblers	Tubing, plates, cups	Stopcock plugs, washers, insulators, tubing

Our 'O. and O.' Department Solves a Problem

By R. J. Maifeld*

In many hospitals central service departments are responsible for storing, issuing, and maintaining oxygen and orthopedic equipment. The author tells why it was decided at his hospital to take the responsibility for this equipment away from the central supply department and establish a separate department for it.

Our "O. and O." (oxygen and orthopedics) department was developed to meet an urgent need for better control of this equipment.

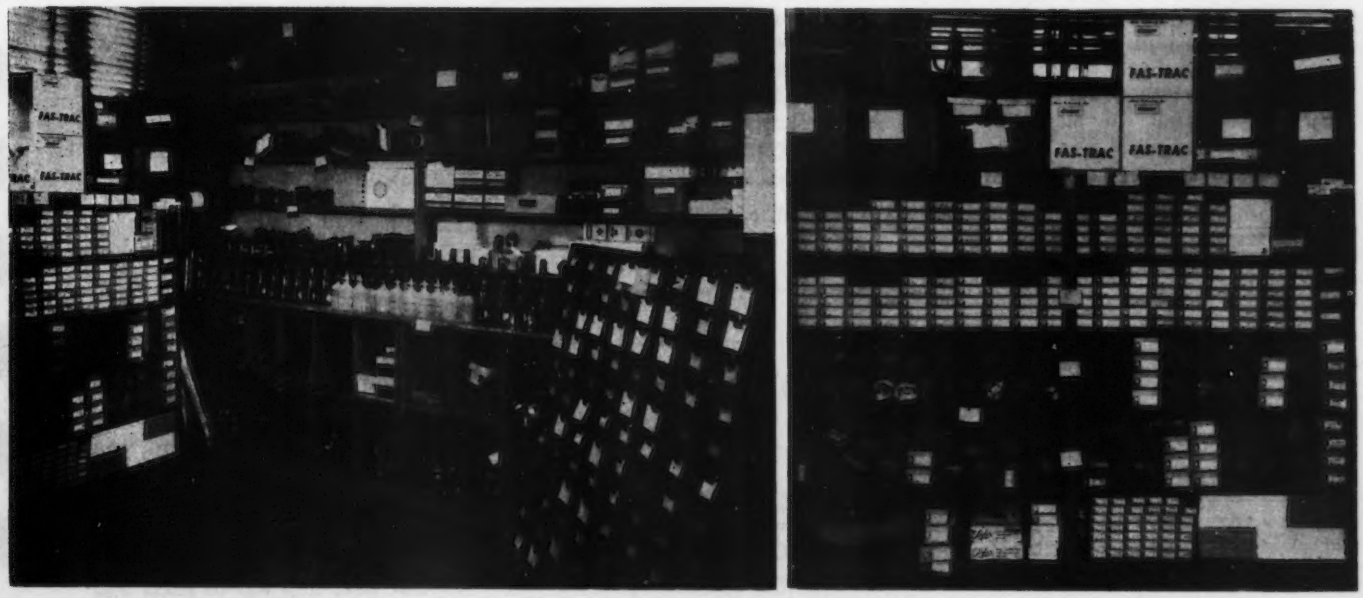
Criticisms from patients and physicians about the condition of this equipment and the apparent shortage of it were increasing. Repairs and replacements had reached fantastic proportions. Income was far below direct expenses.

A survey of the storage, issuance, care, and charging of these items was most revealing. The central supply department was responsible for the storage, maintenance, and issuance of the equipment, but (1) the equipment was stored in separate rooms not adjacent to central supply; (2) the orderlies, from the newest to the oldest, were responsible for procuring, setting up, and returning the equipment; and (3) the nurses were responsible for the equipment charge and the daily oxygen charges.

The nurse in charge of central supply was the only person in the

NOTE: The author extends his appreciation to Bob Rowland of the Ohio Chemical Co. and to Harley Baxter of Zimmer-Baxter Associates for their cooperation in the organization of the department, for their assistance with the article, and for the accompanying pictures.

*At the time the article was submitted, Mr. Maifeld was assistant administrator, Spartanburg (S.C.) General Hospital.



Two views from combined department for storage and control of oxygen and orthopedic equipment. A two-faced mobile board (above, left) holds numbered slips of paper, color coded to provide visual guide to location, availability and condition of equipment.

department who was familiar with the equipment and had any interest in it. However, it was only a secondary responsibility for her. Her time was limited, and she was not available around the clock. She kept up with the equipment and checked it for operational defects as best she could in her limited time.

Much of the equipment accumulated in the hall before it could be put away, and was sometimes re-issued without being checked. Some of it did not get back to central supply. It went from patient to patient, or was stored in utility rooms or nooks and crannies. Often, parts just disappeared.

It was no wonder, then, that faulty equipment frequently appeared at the bedside; that equipment often broke down soon after it was placed on the patient; that it often appeared that we had insufficient equipment to serve the patients, or that 50 percent of the time the patient was not charged for the use of the equipment.

The orderlies had absolutely no training in the care or use of this equipment, yet they were responsible for obtaining, setting up, dismantling, and returning it. Only a few had acquired any knowledge of the equipment, yet one of them was handling it almost constantly from 8 a.m. until 10 p.m. and sporadically the rest of the 24 hours.

An examination of patient charts and accounts revealed that 50 percent of the oxygen used was not being charged. The excuses were many, but the main reason was that the nurse was too busy with patient care to conscientiously concern herself with routine paper work.

It was evident that something had to be done. We consulted the suppliers of both oxygen and orthopedic supplies to find out what other hospitals did to control equipment, supplies, and charges.

An exchange of ideas with the suppliers led us to believe that it might be feasible, economical, and profitable to combine the equipment and supplies of these two services and set up a department for them with a full-time, trained staff.

A room was selected near the least-used elevator. Shelving and bins were built to line two walls. The space between shelves and the bin sizes were determined by the size and quantity of the items to be stored. These included such things as oxygen humidifiers and gauges, oxygen masks and catheters, rubber tubing, metal splints, halters, traction belts, rib belts, weights, pulleys, small traction bars, traction hooks, ropes, crutch pads, and tips and walking heels.

Such items as large and long over-bed frame parts, crutches, and Thomas splints were hung on long pegs and racks on the other two walls. The oxygen tents were moved into an adjacent alcove.

The hospital was then thoroughly scoured for all outstanding equipment. The equipment not in use was properly stored, and the equipment in use was recorded as to its location. This provided a complete inventory of equipment. Shortages were noted and filled.

All oxygen tents, tent gauges, wall gauges, Mist-O-gen sets, and Croupettes were numbered so that a control could be established. This control consists of a two-faced 4′ x 5′ mobile board. On each side of the board at 6″ intervals across and 4″ intervals down, metal paper clamps are fastened.

Each row of clamps designates a different type of equipment, and each clamp on one side is numbered with a number corresponding to a piece of oxygen equipment of that type. The rows on one side are numbered and used for orthopedic equipment (see picture).

A square of yellow paper under a clamp on the oxygen side indicates that that particular piece of equiment is not in working order. This square shows the date the equipment was sent to be repaired and where it was sent. This record enables the supervisor to follow up at reasonable intervals.

A square of blue paper under a clamp indicates that the piece of equipment is in stock and ready for use. This enables the supervisor to inventory any type of equipment at a glance.

A white slip indicates the equipment is in use. This slip is a duplicate of the initial charge slip, and contains the patient's name, room number, type of equipment, and use (continuous, P.R.N., etc.).

On the orthopedic side of the board, there is a row of clamps for basic over-bed frames, patient helpers, end pieces with pelvic traction, end pieces with head traction, Buck's extension, and miscellaneous equipment.

Orthopedic equipment is charged out on a triplicate charge slip (see sample). The white copy is the charge slip. On removable items such as head and pelvic traction and splints, the charge is the full cost of the item. The yellow copy is a file copy, retained for 90 days. The pink copy is placed in the proper column on the board, and on returnable items is used as a credit to the business office when the item is returned in good condition.

Our next step was to select and train personnel for the department.

SPLINT CHARGE SLIP

No. _____

_____, 19___

Received of _____ Hospital

_____ Splint; Number_____
(TYPE OF SPLINT) (ZIMMER CATALOG NUMBER)

Charge to _____ _____
(PATIENT OR DOCTOR) (ROOM NUMBER OR ADDRESS)

Price $_____ _____
(SIGNATURE OF DOCTOR)

When this splint is returned IN GOOD CONDITION within 90 days, the patient's account will be credited with $_____

Wall storage for large items: over-bed frame parts, crutches and Thomas splints hang on long pegs and racks in safe, accessible positions.

To give us full coverage, we chose four orderlies. In addition, we picked an excellent aide to be the supervisor.

The suppliers then spent several days with the personnel, teaching them how to use and care for the equipment. Supplemental classes were held weekly thereafter, for about six weeks.

The nurses readily accepted the new procedure, which has many advantages for them. The equipment is not constantly underfoot; it is always immediately available; the nursing staff does not have to worry about obtaining it and setting it up; and less paper work is involved for the nurses.

The nurses' responsibility is now limited to ordering the equipment, inspecting the set-up, and turning on the oxygen. It is now the O. and O. supervisor's task to make the initial and daily charges.

To insure that all charges are made and all equipment is returned promptly, the supervisor each morning makes an inventory list of outstanding equipment from the board. She then tours the hospital, verifying that each piece of equipment is still in its proper location and functioning properly. She also notes the oxygen usage by each patient and makes the daily charge.

If a patient has moved, she can readily obtain the new location, or in case of a discharge of which she has not been notified, she can return the equipment immediately. Rarely does it happen that she is not notified. She receives a copy of all routine transfers and discharges and can recover the equipment immediately and complete the charges.

Economically, this system proved sound from the start, because the increase in posted income slightly more than offset the cost of personnel salaries and supply, repair, and replacement costs.

The really big benefits, however, were the improvement in patient care and the decrease in complaints from physicians, nurses, and patients. Trained personnel and equipment in top condition are available around the clock, and the nursing staff doesn't have to deplete its ranks at a critical moment to provide the service.

Now that this department has been operating efficiently for over a year, we have taken another close look at it and feel that several improvements can be made. The master board takes a lot of room. We believe that the same purpose and efficiency would be served by a Kardex file.

We also believe that the orthopedic or splint charge slip can be better designed to accomplish the same purpose with less writing and for use with the Addressograph. And we think a central orderly pool would be economical.

How to Care for Stainless

From a paper by Richard E. Paret

*(*More than 500 items of stainless steel equipment are found in hospitals today — many in the central supply department. The importance of proper care of such equipment is apparent.*

The Bureau Research News, *published by the Hospital Bureau, Inc., contained an excellent article on this subject in its October, 1959 issue, condensed from a paper by Richard E. Paret, of the Committee of Stainless Steel Producers, American Iron and Steel Institute. We obtained permission to reprint that condensation here, and have added to it several paragraphs and a table from Mr. Paret's original paper. — THE EDITORS.)*

Although there are over 35 standard stainless steels produced, only about four are used for hospital applications. They are Types 202, 302, 316, and 430. Of these Type 302 is the most prevalent for general hospital service, nursing utensils, and surgical equipment.

In the sterilizing and supply unit, cabinets, counters, sinks, shelves and conveying equipment such as slides and dumbwaiters are regularly made of Type 302 stainless steel or one of its alternates. The sterilizer itself usually has a stainless steel casing and, depending on the manufacturer's preference, often is made entirely of stainless steel.

Type 430 introduced during the Korean War is a nickel-free stainless with slightly less corrosion resistance than Type 302. Type 430 should give equivalent service to Type 302, yet it requires greater care and more frequent and thorough cleaning.

The newest stainless among the four mentioned above is Type 202. It contains less nickel than 302, but has essentially the corrosion-resisting qualities of that type.

For special corrosion resistance applications as found in x-ray photographic laboratories where "hypo" is used, Type 316 is recommended. In addition this grade of stainless is more resistant to the halogen compounds (those containing chlorine, bromine, fluorine, or iodine). When extra corrosion resistance is needed, then, it is preferable to specify Type 316.

Corrosion problems with stainless steel: While the four types of stainless steel just mentioned are generally highly resistant to corrosion from materials and reagents normally encountered in the hospital, there are some chemicals which can cause corrosion if precautions are not taken.

There are several compounds which should *not* be used with stainless steel under any circumstances. These are: aqua regia, ferric chloride, cupric chloride, mercuric chloride, and dilute hydrochloride or sulfuric acid.

Tincture of iodine and aqueous solutions containing iodine (and other halogens) are usually quite severe in their actions. If it is necessary to use these solutions in Type 302 stainless steel containers or in close contact with other Type 302 equipment, contact should be limited to less than one hour. Contact with Type 430 should be somewhat less, while that with Type 316 might be slightly longer.

In all cases equipment should be washed thoroughly immediately after use, rinsed with clear water, and allowed to "rest" for a reasonable period before re-exposure.

Sterilizing agents containing chlorine compounds such as potassium hypochlorite must also be used with caution. Normally two hours exposure is safe for Type 302 equipment. Again exposure time should be slightly shorter for Type 430 and longer for Type 316. Washing and rinsing instructions given previously apply.

The following commonly used solutions should not remain in contact with stainless steel for more than four hours at a time: aluminum chloride, calcium chloride, chlorinated lime, Dakin's solution, ferrous chloride, mercuric chloride, sodium hypochlorite, stannous chloride. Again, equipment should be thoroughly flushed and rinsed.

When solutions are mixed, special precautions should be taken as the combination may be much more corrosive than any single ingredient. Then, too, elevated temperatures increase the speed of activity and many compounds normally non-corrosive at room temperatures become so at higher temperatures, or have lower safe exposure time.

General maintenance instructions:

(1.) Clean frequently-fixed equipment on a regular schedule, mobile equipment after each use.

(2.) Select the easiest method that works.

Frequency of cleaning depends on the rate at which equipment gets dirty. While fresh and soft, soil deposits of all kinds are relatively easy to remove. Liberal flushing with steam or hot water and soap or detergent insures thorough cleaning in service and

Steel Equipment

laboratory areas where such treatment is feasible. Thorough cleaning is important, particularly where Type 430 is used.

Special cleaning solutions formulated for the removal of blood are valuable time-savers and effective cleaners in laboratory and surgical departments. Often, too, standard household detergents such as Fab or Tide have wide application for this type of removal.

Deposits of milk residue may be found in nursery or formula kitchen equipments. Klenzade and Oakite are typically recommended "milkstone" removers.

In general, cleaning stainless steel kitchen utensils will demand very little effort. Removal of baked-on residues may require a gentle to vigorous polishing action with a suitable cleaner. Rubbing should be as gentle as possible and always done in the direction of the polishing marks on the steel. For conventional deposits, use a soft cloth; for more resistant deposits, use a stainless steel scouring sponge.

Common steel wool, scrapers, wire brushes and the like should never be used as they may roughen or gouge the finish, and may leave small particles of steel embedded in the surface which tend to rust, causing spotting, or even act as foci for pitting.

A nitric acid rinse may be dictated where stubborn deposits of organic, mineral, or carbonaceous materials have accumulated. Precautions should be taken to make sure that this solution does not come in contact with parts of the stainless equipment being cleaned that are fabricated of other materials. After the use of a strong

TABLE I

TYPICAL CLEANSERS FOR STAINLESS STEEL

CLEANSING AGENT	METHOD OF APPLICATION	REMARKS
1. Normal service dirt, urine, blood, etc.:		
Soap or detergent and water. Rinse with clear or ammonia water	Sponge, rag, etc.	No effect on finish
Haemo-sol or other special blood solvents	Sponge, rag, etc.	No effect on finish
2. Traffic film on casework, fingerprints on doors, etc.:		
Lumin Cleanser and Lumin Wash Lac-O-Nu	Rub with cloth as directed	Satisfactory for architectural finishes
3. Tightly adhering deposits:		
Finely bolted whiting, Grade FFF Italian Pumice	Rub with damp cloth	No effect on finish
Permapass Liquid Nu Steel	Rub with small amount on dry cloth	No effect on finish, but use light pressure on high luster surfaces
Samae Cameo	Rub with damp cloth	No effect on finish, but use light pressure on high luster surfaces
Paste Nu Steel DuBois-Temp	Rub with small amount on dry cloth	Satisfactory for No. 4 finish, but will scratch No. 8 finish
Cooper's Stainless Steel Cleaner	Rub with damp cloth	Satisfactory for No. 4 finish
Bon Ami	Rub with damp cloth	May slightly scratch No. 4 finish unless rubbing pressure is light
Penny-Brité Copper Brite	Rub with small amount on dry cloth	May slightly scratch No. 4 finish unless rubbing pressure is light
4. Heat tint or heavy discoloration may be removed with:		
Penny-Brite Copper-Brite	Scour with dry cloth	Excellent heat tint removal
DuBois-Temp Paste Nu Steel	Scour with dry cloth or stainless steel wool	Very good heat tint removal
Concor-Abcor-Metal Surface Cleaner	Scour with cloth pad, buffing wheel or brush	Leaves a clean surface with finish according to particular grit size employed
Allen Polish Steel Bright Wyandotte Bab-O	Scour with damp cloth	Very good heat tint removal
5% Oxalic Acid (use warm) 5-15% Nitric Acid or 5-10% Phosphoric Acid Always follow with Neutralizer rinse	Swab or immerse	Good discoloration removal
(Heat tint removal will result in some scratching of the surface.)		
5. Solvents for removing grease, oil, fatty acids, etc. where swabbing or rubbing is undesirable or impractical:		
5-15% Caustic Soda (hot or cold) Up to 6% Solution of: Sodium Metasilicate Trisodium Phosphate Sodium Tetraphosphate Sodium Hexametaphosphate Tetrasodium Pyrophosphate Sodium Tri-polyphosphate		
6. Organic solvents for removing grease, etc.:		
Acetone Ether Alcohol Toluol Xylol Benzol Kerosene Gasoline Benzine Naphtha Oakite No. 33		
7. Chemical cleaner for tough jobs — rust, discoloration, etc.		
Oakite No. 33	Swab and soak 15 to 20 minutes, rinse and dry	May be harmful to paint, wood, fabrics, galvanized steel, rubber, etc. Use synthetic rubber gloves, apron and goggles.

Notes: Ordinary wool or steel brushes should never be used on stainless steel surfaces. Particles of steel may become imbedded in the stainless steel surface, and rusting of these particles will eventually appear as stains. Use stainless steel wool or sponge, or fibrous brush or pads instead.

For heavy hard water deposits, 15-20% (by volume) nitric acid is very efficient. Acid treatment should be followed by a thorough water rinse.

The action of soldering fluxes should be neutralized immediately with a 5% sodium carbonate solution.

solution such as a nitric acid rinse, the equipment should be flushed with clean hot water.

Cabinets, casework, doors and other architectural items of stainless steel usually require normal dusting and an occasional soap and water washing, followed preferably by an ammonia water rinse.

Fingerprinting will be the main cause for additional maintenance for esthetic reasons. It can be held to a minimum if cleaning is done with a recommended metal cleaner or wash. A good cleaner will not only remove grease of fingerprints and traffic film, but will leave a thin coating of wax of silicone which will mask subsequent fingermarks quite effectively.

Heat tint removal: Some pieces develop slightly darkened areas on their surface. This is called "heat-tint," a surface phenomenon caused by thickening of the oxide surface of the stainless steel. Though the appearance of the pieces may be marred, corrosion resistance is not impaired. Recommended removal procedure calls for vigorous scouring using a stainless steel scouring sponge and a suitable tint remover.

The following preventive maintenance technics will minimize heat tinting:

(1.) Use only enough heat to do the job.

(2.) Do not apply heat to empty equipment.

(3.) Avoid concentrating heat over a small area.

A Simple Siphon for Initiating Gastric Drainage

By M. Michael Eisenberg, M.D.*

• *The following article is taken from the current practice manual of the Peter Bent Brigham Hospital. This material, which appeared in Bulletin 98 issued by the current practice committee, is reproduced here with the permission of the executive committee of the hospital. Hospital staff members report that they have found the procedure most effective and useful.*

Purpose: To describe a technic for initiating the siphon used in standard Wangensteen suction. To eliminate the use of breakable cumbersome Asepto syringes, now used for this purpose.

Data: The present method of initiating the siphoning action between the second and last bottles in the standard three-bottle suction apparatus consists of inserting the tip of an Asepto syringe into the end of the drainage tube and creating a negative pressure by squeezing the rubber bulb and then releasing it.

Recommendations:

1. A stiff rubber bulb (Davol, 3-oz. capacity), open at both ends, is placed in continuity with the drainage tube by plastic adapters (Davol).

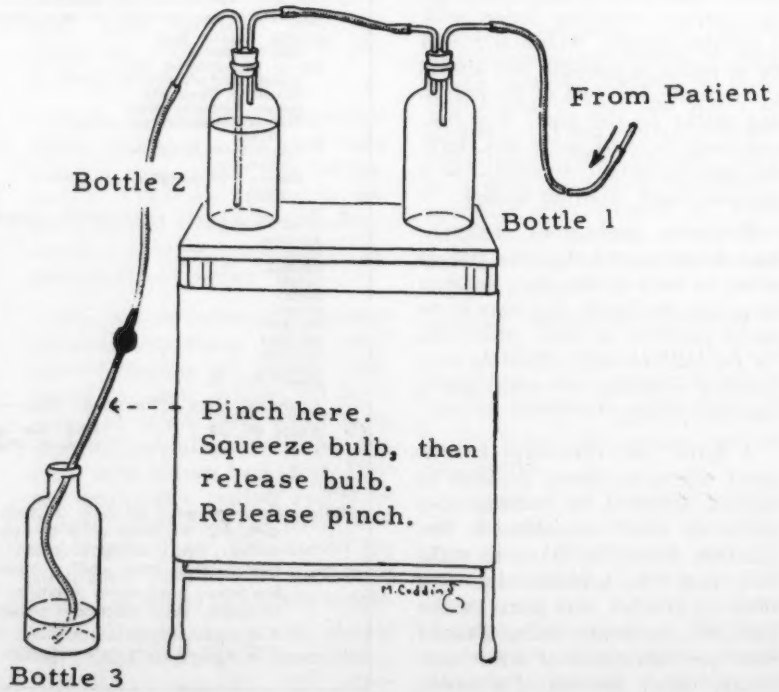
2. To achieve a negative pressure in the tube, the bulb is squeezed, and the drainage tube is pinched off between the thumb and forefinger, distal to the bulb.

3. The bulb is released, starting the siphon, and the drainage tube pinch is released.

Central Supply Room:

1. The 50" Tygon tubing (for three-foot Wangensteen) and the 66" tubing (for five-foot suction) are severed in half. The rubber bulb, with adapters in place at either end, is connected to each half length of tubing.

2. Wangensteen suction is provided clean, but not sterile. After each use, the adapters and rubber bulb are to be washed in 1:1,000 sodium hypochlorite, rinsed with tap water, and allowed to dry thoroughly before being reassembled in a fresh set-up.



*Dr. Eisenberg was a surgical resident on the house staff of Peter Bent Brigham Hospital, Boston, when he wrote this material.

Streamlined Setup at Indianapolis General Helps Cut Equipment, Manpower Costs

By Ellen L. Davis

• The central supply department at Indianapolis General Hospital is open 24 hours a day, seven days a week. In a typical 24 hours, it prepares 300 treatment trays, handles an average of 1,253 needles and 1,535 syringes, and over 1,000 small items for surgery, including sutures, ABD pads, applicators, and surgical silk, which is rolled by hand.

The only supplies which do not stem from central supply are drugs, requisitioned through the hospital pharmacy; linens, which come from the hospital laundry; and office supplies, which are housed in, and dispensed from, the storeroom.

In an average month, the department handles supplies for 1,500 in-hospital patients, 4,000 emergency cases, and 10,000 clinic patients. In addition, it keeps the adjacent Flower Mission TB Hospital and the city and county health offices in medical and surgical supplies, and takes care of the needs of its ambulances—the only such fleet in the city. Five ambulances, on regular and police-dispatched calls, are in continuous service, with one on emergency standby.

To meet these demands, central supply must have, in addition to equipment, an unquenchable desire to do any job under any circumstances. As Mrs. Lucile Rushton, R.N., the department's supervisor, says, "Central supply is big business, and it must be handled exactly and expertly, so that proper levels are maintained in all areas at all times. A shortage of supplies at a crucial time could mean the difference between life and death. It's our job to see that shortages don't occur."

Foreseeable drains on supplies are taken in stride, with no break in routine. When polio shots were first given in the clinics, Indianapolis citizens lined up for 3-hour periods every day for 13 weeks straight. There was no delay while syringes were sterilized or borrowed; there were plenty on hand to take care of the unprecedented need.

An act of God requires a different sort of ability to cope—as when a storm knocked out the hospital's electric power, and an oxygen tank had to be hiked up four floors.

The present smooth-running system did not exist less than two years ago. Prior to February, 1957, there literally was no central supply. Forty-five area stations handled their own equipment, using the boiling method of sterilization.

All that the area stations had in common were poor facilities and an abiding passion for hoarding. Run-of-the-mill requests to borrow equipment (emergencies were an exception, of course) found other areas consistently fresh out.

Allen J. Perrez, Jr., administrator, and Beatrice Miller, Ph.D.,

Disposable syringe protectors and heat-sealing bags have reduced syringe breakage almost to the vanishing point. Impressive, too, is the reduction in man-hours: workers now require only 77 hours, as against 168 hours previously, to prepare the weekly put-up of 14,791 syringes.

director of nursing education at the Indiana University Medical Center, decided one of the first steps in establishing a central supply department was a hospital-wide inventory of supplies.

They were amazed that everyone seemed to be scraping the bottom of the supplies barrel. They were somewhat surprised, too, at the number of small cabinets—locked—which they were assured contained nothing of interest. When suggestions or direct orders didn't open the doors to reveal supplies stashed away against shortages, force did.

"We actually had to do some jimmying," Mr. Perrez recalls. "It was an unfortunate state of affairs, but it could have been worse. Considering the difficulties under which our personnel worked, they might have taken a 'don't-care' attitude. Instead, they were looking out for their own—though in an unorthodox way, to be sure."

When Mr. Perrez and Dr. Miller put their heads together to organize a central supply department, they had a lot of wants, and very little money. The hospital operates on tax money, and there was very little available. The money which *was* available, however, went for new, topnotch equipment.

There was a room which was used to store oxygen and orthopedic equipment. This became the central supply department. Walls were pushed out to clear a large area in which there is only one crossflow of work.

Besides single-mindedness of purpose, General's administrator and staff have a try-anything-once attitude. "We are *actively* interested in innovations," says Mr. Perrez. "We operate in an area that is research-minded; we co-operate with manufacturers in testing new ideas. One of our recent assignments was to make up, for Eli Lilly and Co. experiments, the original pattern for a sleeve for feeding mosquitoes. Our sewing department used double Indian-head cloth with a cuff to protect the hand from bites.

"Lilly maintains a 17-bed ward here for hypertension patients referred by doctors all over the U.S. Some of these patients have a blood pressure as high as 300. The ward is staffed by an R.N. around the clock, and the patients participate in outpatient, obesity, and other clinics. We test new drugs, and make up any special items desired."

The sewing department, open seven days a week, also finds itself caught up in the progressive research-mindedness of its environment. Special items for the medical school are turned out as a matter of course; original patterns for manufacturers testing new ideas are a welcome challenge.

Some of the ideas tried in the department have been dismal failures; others have saved time and money. Up until January of this year, the department used the familiar constriction tubes with cotton plugs for needle sterilization. The breakage was expensive; the tubes were difficult to clean for reuse. Needles became burred, and the identification gauge blurred through repeated, unprotected sterilization.

In January, a manufacturer asked the hospital to test a new disposable needle protector, and a disposable heat-sealing envelope*. The protector is designed to prevent the needle from puncturing the bag; the envelope, sealed and autoclaved, maintains sterility.

The envelope is color-coded for the various gauges, and several lengths are printed on each bag—the proper length being circled by the aide. This system has proved no more costly, in initial layout, than the old method, but damage to needles has been reduced considerably, and breakage of tubes has been eliminated in needle sterilization. Man hours remain the same: four hours a day for the 16,000 put-ups a week.

*Stanvelopes, made by Stanley Supply Co., Inc., Dallas, Tex.

Syringes formerly were wrapped in ordinary Kraft paper wraps. Breakage was very high, and handlers were never certain the paper had not split after autoclaving.

Disposable syringe protectors and heat-sealing bags have reduced breakage almost to the vanishing point. While their base cost is greater than that of the ordinary paper wraps, the average breakage is currently 28 syringes a week compared with 48 a week previously. The average weekly put-up of 14,791 required 168 man-hours previously; it now takes 77 man-hours.

General's central supply is run with beautiful precision. Supplies are stacked with a military orderliness on shelves, and are dispensed, returned, and accounted for in the same manner. The production is handled by 31 persons, including practical nurses, aides, orderlies, and the women in the sewing division.

A typical month finds the department issuing 45,000 syringes, 380,000 hypodermic needles, 9,500 sterile trays, 15,500 pairs of sterile gloves, and around 13,000 bottles of intravenous solutions.

Central supply operates partially on an exchange basis. Wards are set up with a basic list of supply needs for an 8-hour period. Basics include such items as sterile trays, special sterile equipment, and sterile solutions. These are exchanged at the end of an 8-hour period, and

Left: Needles are cleaned with successive streams of distilled water and air. Those stopped up are removed from the machine and examined for possible damage. If the trouble is simple clogging, needles are cleared with a stylet, then returned to the machine for further cleaning.

Below: Oxygen and inhalation therapy gases and equipment are also the concern of central supply, where they are kept ready to be dispatched speedily on call to any part of the hospital.

fresh stock is issued to keep the basic list at the prescribed level.

Every floor has a catheterization tray, and can get an extra one on a loan basis. A card on each tray lists the equipment it holds, so that it can be checked before being returned.

Supplies for areas are identified by different colors (22 of them) so that items do not get shunted about, or lost. All supplies are rotated to equalize wear, and all are rested for 48 hours before being put back into circulation.

Items not on the basic list, such as bed cradles, aspirators, suction machines, and orthopedic appliances, are issued by central supply on a loan basis to the wards. Bandages, adhesive tape, tongue blades, applicators, and other surgical supplies are dispensed by the department on a weekly basis.

Careful records of all supplies are maintained in the department with scrupulous care to insure immediate location of all equipment at all times.

A big portion of the department's supplies includes the various gases, such as oxygen, nitrous oxide, cyclopropane, and helium, and inhalation therapy equipment. Gases and equipment are dispatched to the various wards and surgeries as the need arises.

The department has four autoclaves, including one high-speed sterilizer. It produces distilled water for the entire hospital, and makes up normal saline solutions. Previously, the laboratory made its own distilled water, and the rest of the house got what was left over—if any.

When needles are returned, they are put into a sponge (to protect the points), which has been saturated with a germicidal solution to loosen soil.

The needle cleaner passes distilled water, then air through the needles. If they are stopped up, they are removed from the machine and cleared with a stylet, then returned for finishing.

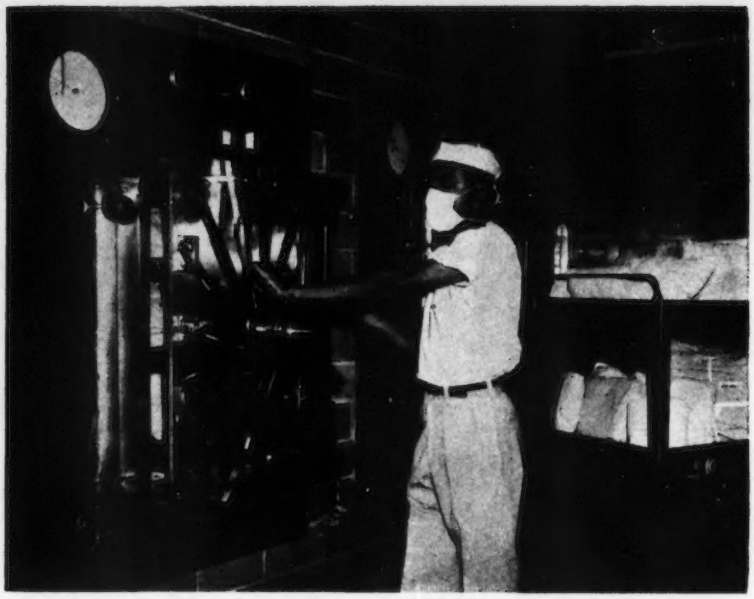
Only nylon or plastic trays are used for needles, to further prevent burring or breakage.

Workers handle 400 dozen pairs of rubber gloves a day, plus 75 singles for rectal examinations. Gloves are washed in an automatic glove-washing machine, and then are powdered in a powdering machine.

The sewing department, which also operates seven days a week, uses material by the bolt to make up the special items, such as drapes for surgery, and supplies needed for medical training.

The try-anything attitude of General's central supply department has made it an enthusiastic user of disposables—enema and blood sets, IV tubes, towels (which save greatly on laundry), and just about anything else it can get prepackaged.

Mr. Perrez and Dr. Miller attend as many national meetings as they can work into their schedule, and keep in touch with other hospitals to get ideas they can pass along to Mrs. Rushton. The latter arranges tours of her department for lay groups, and provides demonstrations, such as in the use of oxygen therapy. These efforts have contributed much to good community relations for the department and the hospital.



Establishing the central supply department involved considerable substitution of initiative for money. Whatever funds could be allocated to the project, however, went for top notch equipment such as four autoclaves, including a high speed sterilizer. Department also produces distilled water for the entire hospital, and makes up the normal saline solutions.

Central Supply—Nerve Center of the Community Hospital

By John H. Gorby*

This article was one in a series on hospital organization, based on lectures given at meetings of the Association of Western Hospitals and allied state groups.

• Central sterile supply service offers the community hospital the kind of savings usually associated with elimination of duplication and related inefficiencies. Its principal function is the furnishing, as needed, of sterile supplies and equipment.

In a few remaining hospitals, certain departments maintain their own sterilizing apparatus, but by far the more common practice today is to have a single sterile-supply unit to service the chief requirements of the operating room, the delivery suite, the nursing units, and other areas of the hospital.

Modern sterilizing technics call for more space than is generally available in the immediate operating-room area. Although operating rooms seldom have enough space for major autoclaving equipment, they do require a sterilizer for the quick sterilization of some essential instrument which may have become contaminated while in usé, especially if a heavy volume of surgery is scheduled.

Functions of the central sterile supply department and those of the operating rooms and other units should be thought of as separate and distinct. Even though the operating rooms may have equipment for sterilizing instruments, there is no need for them to sterilize linens, gloves, dressings, and other surgical supplies as well. The provision of all linens, including drapes and packs, for surgery and the delivery suite, as well as all sterile items for the various nursing units, should be the responsibility of the central sterile supply department.

ADVANTAGES

There are substantial advantages to having such a department. It reduces over-all inventories of such supplies and equipment as syringes, needles, and solutions. Furthermore, with the concentration of specialized personnel and equipment possible in a central unit, such materials as treatment trays, oxygen equipment, intravenous solutions, and sterile packs for nursing units and delivery and operating rooms can be made ready and sterilized more quickly and more dependably than when the sterilization procedure is decentralized among the various units.

LOCATION

Local and individual circumstances determine the administrative relationship of central sterile supply to the nursing service or the general supply service.

Although the central sterile supply department began as an adjunct to the operating rooms, experience has indicated that it may also be located near the laundry and general stores without decreasing its effectiveness. In fact, when it is so located, it is possible to centralize all supply activities. Easy accessibility to freight and passenger elevators is an important consideration.

For most efficient handling of supply distribution, hospitals are finding a regular messenger service effective. Under this system, each floor or nursing station should know at approximately what time the messenger will call. Requisitions should be ready for him to pick up. After the requisitions are filled, delivery is made of all except extremely bulky items.

ACCOUNTING PROCEDURES

A hospital's central supply room can be one of its major income-producing areas. Medication trays,

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catheter trays, enemas, oxygen equipment, syringes, and practically all equipment in use at the hospital originate at one time or another from this department. All orders for equipment to the central service area should be on valid requisitions and should bear the signature of someone authorized to make a requisition.

Pricing of requisitions is usually done by the department. Requisitions are then sent to the business office for posting to the patients' accounts. Other items may be charged to the nursing-service department, the operating room, the delivery suite, or whatever unit requisitioned the material.

Some central supply services have adopted a pegboard system. This provides an excellent method of maintaining a simple, easy-to-use charge system.

When the requisition is brought to central supply, the patient for whom it is intended or the department requisitioning it is charged for the material. Charges are recorded by means of a duplicate, pre-numbered set of strip tickets which may be detached after they have been completed. The original goes to the business office for charge to the patient or department; the duplicate remains in the department for a period of time established under administrative procedure.

STAFFING

Central sterile supply may be directed by the superintendent of nurses, by a nurse responsible to her, or even by the hospital administrator. It has also functioned as a branch of the pharmacy. In some hospitals the central sterile supply supervisor reports to the operating-room supervisor, but such an arrangement is to be discouraged, because it is apt to result in inadequate attention to the needs of the nursing units.

A typical central supply room will be staffed with from five to eight nonprofessional employees, generally under the direction of a registered nurse or someone skilled in the preparation of sterile supplies.

According to detailed studies in several hospitals, a ratio of one employee to each 30 beds, or multiples thereof, seems to provide adequate staffing for a complete sterile supply service for an entire hospital. The service does not include cleaning and sterilizing the instruments of either operating rooms or delivery suites. The proportion given also allows for development and use of a standard cart or tray system for each nursing unit.

SHIFTS

A small central sterile supply unit may have to run two or even three shifts. A single shift may suffice if there is enough space as well as sufficient vertical transportation. Of course, a single shift substantially reduces the amount of supervisory personnel needed.

However, in any hospital with more than 50 or 60 beds, the central supply room should be open at all hours so that equipment may be obtained when it is needed. In smaller hospitals 24-hour coverage is not so important, as generally the nurse in charge has a key and may in an emergency get the required equipment or solutions.

Generally speaking, hospitals with more than 60 beds maintain their central service areas on a 24-hour basis. The larger the hospital, the greater the need for around-the-clock service. If the hospital maintains a blood bank, it is frequently found in the central supply area. It is essential that there be prompt access to whole blood at all times.

SUPERVISION

In the average community hospital it is probably sufficient that a nurse be in charge of the central supply department during the daytime only. If a reliable, well-trained crew comes on in the evening, it is acceptable to permit these people to perform routine tasks without the direct supervision of the central supply supervisor. Such supervision as may be required can be given by the nurse in charge or someone else in authority.

Ordinarily a central-service department uses afternoon and evening periods to wash, dry, and powder gloves, to clean syringes and needles, and prepare them for autoclaving or, in some cases, actually to autoclave packs for the next day's use.

PACK PREPARATION

Every pack prepared for use should have a heat-sensitive chemical indicator inserted in it. Such a device turns color after proper sterilization, indicating the pack has been autoclaved. Another indicator of sterilization is found in available heat-sensitive tapes which are placed on the outside of each pack.

In addition, the laboratory should run a culture at least once a month or oftener on a test tube inserted in the autoclave, to make certain that the heat is intense enough to kill all pathogenic organisms. Results of these tests should be logged in the records of the central service area.

EQUIPMENT

For a hospital of 50 to 75 beds the central sterilizing and supply room should be at least approximately 20 x 25 square feet. The area should be well lighted and have work space and benches around all sides of the room.

A minimum requirement should be a 24″ x 36″ dressing sterilizer. There should also be a small water still with a capacity of at least five gallons an hour.

On one side of the room there should be a space for washing items to be processed. There should be generous work space for inspections and for assembly of packs on a large table in the center of the room, and storage space for sterile supplies around the perimeter of the room.

A glove-drying rack may be adequate for a small hospital, but a larger hospital will probably use a glove-conditioning machine.

Besides the dressing sterilizer there should be a hot-air sterilizer at least 18″ x 14″ x 14″. Adjacent to the area should be a storage room for unsterile supplies and equipment.

In a hospital of about 100 or 125 beds, the central sterilizing and supply room should be at least 30′ x 20′, or 600 square feet. Many hospital administrators fail

to realize that this is perhaps the most important area in the hospital. It should have adequate work space with good ventilation and lighting. An error in procedure in this department can result in patient infections with liability to the hospital.

A hospital of 100 to 125 beds should have two dressing sterilizers, one 24" x 36", besides a water still, glove-drying equipment, a hot-air sterilizer, and the usual other equipment.

BULKY ITEMS

In a hospital of 100 beds or over, large quantities of intravenous solutions are used, generally in the 1,000-cc. size bottle. Whether the hospital prepares its own solution or buys it, the bottles are still bulky and somewhat difficult to handle.

One hospital in the West set up an ingenious system of chutes on a slight incline. The chutes, just large enough to hold either a 500-cc. or 1,000-cc. bottle, are only four or five inches wide. Running along the wall, they take up very little space.

Starting at a small balcony in the rear, these chutes are periodically filled as the use justifies. Normally two or three days' supply of solution is contained in a chute at one time. The chutes save time and simplify the handling of this otherwise bulky material.

A similar method of handling large quantities of bulky items such as 3 x 3 and 4 x 4 sponges was adopted at the same institution. A chute leads from the balcony at a sharp incline so that the packages of sponges are fed by gravity. This arrangement also saves considerable storage space. Bulk supplies may be stored on the balcony, and chutes periodically refilled as demand justifies.

It has been said that a well-planned central service department can store five or six times the amount of supplies as one not properly designed and carefully organized.

COORDINATION WITH LAUNDRY

Laundry personnel should be trained to fold sheets and other linens so that central supply department personnel will not have to repeat the operation when assembling linens for sterilization. Delegating this task to laundry personnel will save time and space and make for less stirring up of lint and linen particles in the central supply department.

Coordination with the laundry will also free central supply department personnel for more essential work, such as cleaning, packaging, and sterilizing surgical instruments and equipment for the operating room and delivery suite.

TRAYS

Special treatment trays—sometimes as many as 70 different kinds—are maintained in some central sterile supply units. Each includes needles, syringes, hemostats, ABD's, and other items. They are usually prepared in advance and kept on hand.

Compresses and other types of dressings, of course, are used and thrown away. But treatment trays, for the most part, consist of nonexpendable items and must be returned to central sterile supply after use.

SUPPLY CARTS

Some nursing units maintain floor stocks of dressings, trays, adhesive tapes, and other items not normally charged directly to the patient. Smaller stocks may be maintained if a standard tray or sterile supply cart is supplied to the nursing unit by the central sterile supply department.

Much time is lost in the central sterile supply department when there are no standard supply stocks in the nursing units and no standard supply tray. There is a constant flow of requisitions for supplies. By setting up standards, a hospital can cut down significantly the number of requisitions to central sterile supply.

Studies indicate that 20 minutes a day on each nursing unit is more than adequate for the preparation of central sterile supply requisitions. In addition, 25 minutes per nursing unit are spent by central sterile supply to process and cost requisitions. Personnel of nursing units spend an average of 42 minutes a day traveling back and forth to central supply if there is no delivery service and they have to make supplemental or emergency trips for supplies.

All sterilizing for the floors can be done in the central sterile supply department if the standard cart method is used. A standard daily list of sterilized items needed is developed for each unit, and a cart containing all sterile items is kept in the unit. Central sterile supply personnel pick up and restock this cart, usually at night. When restocking is done by the night shift, there is easier and more rapid access to elevators during the busier daylight hours.

SUPPLY STANDARDS

Other advantages of the cart system include standard quality of sterilization, avoidance of detailed order-writing by nurses, controlled processing and costing of central sterile supplies, and reduction of elevator travel during the day.

Simple steps can be taken to develop supply standards, whether for an inventory maintained on each nursing unit and filled at regular intervals by the central supply department, or for a cart or tray.

First, record the amount of sterile items used in each nursing unit for approximately two months. It may be necessary, in large hospitals with many medical, surgical, obstetrical and other nursing units, to be guided by the experience of one unit in each category.

Second, note for each item the number ordered by the nursing unit and the number returned after use.

Third, note which items are ordered frequently, occasionally, and rarely.

Fourth, verify with nursing personnel which items may be necessary, even though used rarely, in order to decide which should be included on the standard tray and which should be stocked on the floor or held in reserve.

Fifth, set up specific standards for each division, such as medicine, surgery, and obstetrics.

Finally, after tentatively agreeing on standards for each specific area, set up trays for about two weeks in a typical nursing unit of each area. This pre-test may indicate the need for adjustments in the final tray set-up.

It is helpful for each type of tray or cart to have a fixed layout of items. Keeping the layout consistent will simplify loading, checking for completeness, and locating of items by nurses when they are needed.

Changes in case load and medical requirements will, of course, require modifications of established standards. Periodic reviews will help keep the standards relative to actual needs.

Accounting work done by central sterile supply and the business office can be reduced considerably by the use of standards. Pre-established amounts can be charged to nursing units each month. The need to price individual items is thus eliminated. Inventory control is simplified. Clerical work otherwise required in central sterile supply may be eliminated.

RELATION TO PHARMACY

The pharmacist and the central-supply supervisor should work very closely together, because they have allied problems. Some of the bulkier items that normally would be dispensed from the pharmacy—intravenous solutions, for example—may be obtained from central supply.

Visiting salesmen will bring to the hospital new ideas and new trends in equipment and procedures. The central-supply supervisor can spot items worthy of further investigation and advise the administrator or the purchasing agent.

Attending the recent Tri-State Hospital Assembly from Lake Forest (Ill.) Hospital are Florence M. Taylor (l.), R.N., central supply supervisor, and Annabelle Fritz, R.N., surgical supervisor.

Talks on Disposables Featured On Tri-State CSR Program

The place of prepackaged, presterilized disposable items in the central service department was the theme of the conference on central service at the 1959 Tri-State Assembly in Chicago.

More than 200 persons attended the one-day session. Principal speakers were V. M. Guilmette, western regional manager, Johnson & Johnson, Chicago, and Basil Burrell, director of research, American Hospital Supply Corp., Evanston, Ill., who discussed "Prepackaging, Presterilizing, and Place of Expendables in Central Service"; and William Rogers, director of marketing research, Pharmaseal Laboratories, Glendale, Calif., whose subject was "Comparative Cost Analysis on Disposable and Nondisposable Supplies." G. K. Lermond, consultant, Wilmot Castle Co., spoke briefly on uses of ethylene oxide sterilization.

Rose Will (l.), L.P.N., Grant Hospital, Chicago, and Iris Hill, C.S. supervisor, University of Illinois Hospitals, Chicago, meet at the Central Supply "Get-Acquainted" Breakfast held at the Tri-State meeting.

Also attending the Tri-State Hospital Assembly are Sister M. Isidore, R.N., and Virginia E. Brazaitis, C.S. supervisor, St. Margaret's Hospital, Spring Valley, Ill.

A group of Chicagoans who gathered after the breakfast are, from left: Marguerite Gillem, R.N., C.S. supervisor, Provident Hospital; Rita M. Stewart, C.S. supervisor, St. Joseph Hospital; Blanche Jorgenson, R.N., C.S. supervisor, Louis A. Weiss Hospital; and Anna Prorok, C.S. supervisor, Arabelle Kutnick, C.S. employee, and Geraldine Skweres, assistant C.S. supervisor, all of Chicago State Hospital.

Outline for Study To Find Glove Costs

How much does it cost to provide a pair of sterile rubber gloves? Many a central supply department supervisor might be unable to give more than a very rough estimate of this cost. Yet information of this sort is becoming increasingly important in these days of rising operational costs, because hospitals are realizing more and more that they must first know their costs in order to make intelligent efforts to control them.

A hospital which does not wish or cannot afford to hire "outside experts" to do a cost study can make its own survey, according to a large manufacturer. This company* suggests using the accompanying outline as a guide for the survey.—THE EDITORS.

*Becton, Dickinson and Co. The editors appreciate the cooperation of the company in granting permission to reprint this procedure.

Step I

Select a time period upon which to base all survey information. This time period should be sufficiently long to be representative of a year's operation. A minimum period would be three months.

Step II

Determine the total number of new gloves used in the base period. Assume a constant inventory of gloves in central supply on the nursing floors and in the operating rooms, unless major changes occur in these inventories.

Obtain from the storekeeper the information necessary to complete the following schedule:

Stores inventory at beginning of base period _____

Add purchases during base period _____

Total gloves available _____

Less stores inventory at end of base period _____

Total new gloves used in base period _____

Prepare a separate schedule for each type of rubber glove purchased or processed in a different manner due to different end uses.

Step III

Determine the number of instances in which rubber gloves are used in the base period, by type of gloves delivered from each sterile supply area. Total _____

Step IV

Determine the average number of times one pair of gloves is used by substituting the factors developed in Steps II and III in the following equation:

$$\frac{\text{Total instances in which gloves were used} - \text{Step III}}{\text{Total gloves used} - \text{Step II}} = \text{Average number of uses per pair}$$

Step V

Determine the material cost incurred in processing one pair by completing the following schedule.

Material Item	Purchasing Unit	Cost/Unit	Quantity Used Per Pair Gloves	Cost Per Pair
				$
	Total material cost per pair processed			$

Be certain to list every item of raw material used. The raw material items listed below are intended to serve as a guide and are not necessarily all-inclusive.

- Soap powder
- Dusting powder
- Dusting powder packets
- Paper envelopes
- Mastic tape
- Sterilization indicators
- Gauze pads
- Muslin squares

Step VI

Determine the labor time and cost in processing one pair of rubber gloves by timing the employees performing the processing operations.

Processing Operations	Time in Minutes	Quantity Processed	Minutes Per Pair
	Total minutes per pair		

Complete the following equation:

Total minutes per pair		Average hourly rate 60 minutes		Labor cost per pair processed

Be certain to secure all of the processing operations performed. The processing operations listed below are intended to serve as a guide and are not necessarily all-inclusive.

- Bag and weigh gloves for washing
- Load gloves in washer and start it
- Add powder to washer
- Unload washer
- Drain gloves
- Load and start dryer
- Unload dryer
- Load and unload powdering machine
- Inspect gloves
- Sort gloves
- Package gloves

Step VII

Secure the purchase price for the rubber gloves used and complete the following equation:

Purchase price per pair of gloves

Average number of uses = Prorated glove cost per pair — Step IV

Step VIII

Determine the cost of providing sterile rubber gloves as required by substituting the factors developed in the above steps in the following schedule.

Step No.	Description	Cost Per Use
V	Material cost	$
VI	Labor cost	
VII	Glove cost	
	Total cost per use	$

It will be noted that overhead, including electricity and depreciation of washers and dryers, is not included as a part of costs. The wide difference in the makeup of these costs as well as the variety of methods of allocation used by one hospital as compared with another would result in distortions in this type of cost analysis.

Hospital Study Favors Disposable Syringe Units

By George N. Johnson*

This is the third in a series of comparative cost studies. The first two were included in the CENTRAL SUPPLY YEARBOOK, Volume II.

The use of injections to treat illness has increased in recent years. At present, the nurses in Evangelical Deaconess Hospital, a 92-bed hospital, give an average of 82 injections per day.

Considering the volume of injections now being given and the possibility of an increased load which would result from a proposed expansion program, the Director undertook an investigation of both the hospital's present method and the feasibility of using disposable needles and syringes.

METHOD OF SURVEY

A quantity of Stylex disposable needles and syringes sufficient for this study was obtained from Pharmaseal Laboratories, Inc. These needles and syringes consisted of a single unit of plastic syringe and attached needle, encased in an airtight paper and cellophane package. The entire unit was sterile.

The disposable combination needle and syringe was tested under controlled conditions and compared both for effectiveness and cost with the present system involving reusable needles and syringes.

The study was approached in three ways:

—Analysis of nurses' time and effort of the two systems

—Detailed cost studies of all elements of expense involved in the two systems, including nursing time

—Evaluation of attitudes as to the advantages and disadvantages of the two systems.

OBSERVATIONS AND FINDINGS

The two methods may be described as follows:

1. Present Method — Reusable Needles And Syringes

In the present procedure needles and syringes are sterilized on each ward, since there is no central supply department. Syringes (which are not interchangeable) and needles are placed in a hot water sterilizer 9" x 10" x 20". After sterilization they are placed in enamel boats and are ready for use.

Supplies of syringes on each floor are as follows:

First Floor	5—2cc	3—5cc
Second Floor	4—2cc	
Third Floor	6—2cc	
Nursery	2—2cc	
P.O.D.	1—2cc	

These stocks are inadequate and resterilization of syringes is sometimes necessary to complete the number of injections needed at one time. Since one hour is needed before the syringes can be properly reused, there is a loss of nurses' time both in preparation and distribution. In trying to make up this time, nurses sometimes remove the syringes too soon or use 5 cc and 10 cc syringes to complete their work.

Another factor, which exists because of the shortage of professional help, is the constant shifting of nurses from floor to floor; changes in tours of duty from day to evening to night, and the reassignment of duties on the unit. In view of these changes the only insurance for adequate standards in handling syringes is an in-service training program. Since there is none available, the standards differ from nurse to nurse, according to her experience. Some of the techniques observed are open to question; for example, no sterile towels are used on the injection tray. The only cover for needles before injection are cotton balls dipped in alcohol.

The following technique is typical:

Preparation

1. Set up tray containing cotton balls in alcohol emesis basin
2. Place tray beside the syringe and needle boats
3. Lay out medication tickets on tray
4. Bring out medication (many must be mixed before using)
5. Attach plunger to proper barrels and attach needles
6. Remove medication from vial or bottle
7. Wrap needle with cotton ball
8. Place on tray.

Injection

9. Give medication to patient

Cleaning

10. Place used syringe in emesis basin
11. Return to utility room
12. Separate elements of syringe and needle and place in container containing liquid soap.
13. Rinse syringe and needle in hot water then place in sterilizer. (In cleaning, no attempt is made to swab out barrel or hub of needle. No attempt is

*Administrator, Evangelical Deaconess Hospital, Brooklyn, N. Y.

made to sharpen the point of the needle.)

The time required to mix medications and sort plungers and barrels adds to the procedure time, but the short cuts in distribution and clean-up reduce the total operation. It must be emphasized that the maintenance of sterile technique is open to question.

2. Expendable Needles And Syringes

The following simple and safe method was utilized by the disposable unit:

Remove medication card from file

Collect tray with:

Container of 2 x 2 sponges in alcohol
Waste basin
Vials of medication
Proper syringe packets

Preparation:

1. Wash hands
2. Place requisition cards on tray with container of sponges
3. Clean off tops of vials
4. Remove syringe, needle and needle cover from packet
5. Twist plunger into barrel then put syringe on medication card
6. Remove needle cover
7. Insert air then withdraw medication from vial
8. Replace needle cover and place on medication card on tray
9. Carry tray to bedside
10. Prepare injection area then inject
11. Replace needle cover then break syringe and put in waste basin
12. Wash hands between patients
13. Clean up
14. Chart

Nurses adjusted quickly to the new syringe units. Within 2 days the medication nurse on day duty found it possible to complete her injection in less time and still have time to assist the doctors and help the desk nurse with charting and other administrative work.

ANALYSIS OF COST

Following is a summary of questions that had to be resolved in

COST OF PRESENT METHOD

Operation	Average Time (seconds)	Number of Injections Observed	Total Time (seconds)
Preparation of injectable at the nursing station	93.5652	46	4304
Time spent by nurse going to and from nursing station and patient	15.0800	47	709
Injection procedure	78.7872	47	3703
Disassembling and rinsing	10.6842	38	406
Sterilization, cleaning and putting into sterilizer	50.7777	18	914
Removing from sterilizer	57.1304	23	1314
	036.0247	219	11350

Time per injection	306.0247 seconds
Labor time per second	.00048 seconds
Labor cost per injection	$ .146891

Supplies	Number Purchased	Cost
Syringes	356 (inc. 300, 2cc plus 56 est. 5cc and 10cc)	$ 401.72
Needles	6,156	680.17
Electricity for sterilizer @ .025 per KWH—20 hrs. per day (4 stations).—Sterilizer uses 2 KWH per sterilization of 1 hour	6 hours per day (1 station)	1538.00
		$2619.89*

Injections per year est.	29930
Supply cost per injection	.0875

*Alcohol, green soap, and cotton ball costs were not included in the survey.

COST OF EXPENDABLE SYRINGE COMBINATION

Operation	Average Time (seconds)	Number of Injections Observed	Total Time (seconds)
Preparation of medication	62.6304	46	2881
Total administration to patient	63.1304	46	2904
Clean-up	2.9782	46	137
TOTAL	128.7390	46	5922

Time per injection	128.7390
Labor cost per sec.	$.00048
Labor cost per injec.	$.061794
Fringe labor costs (16.9%)	$.010443

Total Cost per Injection Expendable Syringe Combination	
Labor cost	$.061794
Supply cost	.150000
Fringe labor costs	.011443
	$.222237

order to achieve an effective determination of comparative costs:

—How much is it costing the Hospital for each injection?

—How much would it cost to use the disposable needle and syringe unit?

—Which procedure insures the maximum safety to the patient?

All basic data were obtained by the Director of Nurses from detailed time-and-motion studies made under actual working conditions. It was found that seven days of study were necessary to obtain sufficient data for accurate conclusions. See chart.

Additional costs which should be considered by cost accounting procedure, will include fringe labor costs such as the following:

Factor	Percentage Of Annual Labor Costs*
Social Security	2.5%
Sick Leave	4.3
Workman's Compensation	1.1
Free or reduced Hospitalization	2.4
Two weeks Vacation	4.1
Six paid Holidays	2.5
TOTAL	16.9%

On a direct labor cost of .146891 the fringe labor cost comes to .024824 per injection.

*National Survey and Hospital Cost studies.

Summary of Costs

Present Method

Labor for procedure	.146891
Supplies and utilities	.0875
Fringe labor costs	.024824
Total cost per injection	.259215

COMPARISON OF COSTS PER INJECTION

	Present Method	Expendable Syringes
Labor	$.146891	$.061794
Supplies	.087500	.150000
Fringe labor	.024824	.010443
	$.259215	$.222237

COMMENTS ON THE SURVEY

Cost alone is not the total measure of hospital acceptance. Acceptance by the nurses, patients and medical staff is also an important factor. Using the present procedures there is no sustaining, high standard of sterility for injection. Frequent short cuts in technique can result in infection, although there are no statistics available.

By using a pre-sterilized syringe combination, high standards are possible.

Nurses are constantly complaining of dull and plugged needles. They must also bear the brunt of patient complaints since patients may feel that the pain of an improper injection is the result of poor technique. The greater percentage of these complaints can be eliminated by the use of the proper syringe and needles. It is interesting to note that there were no complaints from patients when the expendable syringes were used.

In a hospital of this size, (92 beds) use of expendable needles and syringes should be considered primarily for the ability to control the sterility of needles and syringes used in injections. Since it is difficult to maintain a stable nursing staff with adequate supervision, the use of presterilized syringes and needles reduces the risk of infections.

The cost factor is of extreme importance because the tangible result of use of the expendable needles and syringes is reflected in higher purchasing costs. However, this tangible cost can be more than matched by increased nursing care time available because of their use. If this saved time is utilized properly there is a savings in the overall cost of injection.

At our hospital the saving has been made effective by increased use of graduate nurses' time for additional patient care and administrative assignments. This advantage coupled with the increased safety to patients has made the use of these products worthwhile.

better by far than rubber—
expendable for modern, safer,
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or re-usable . . . the finest is

precision expendable syringe

PHARMASEAL

New Surgical Dressing Technic Helps Hahnemann Combat Staph

By Cecilia D. Yastremski, R.N.*

• With the daily newspapers full of news of hospital staphylococcal infection outbreaks and the technical journals crying for a return to the days of more stringent asepsis and antiseptic technics, Philadelphia's 72-year-old Hahnemann Hospital has re-evaluated its surgical dressing technic and come up with a working, efficient, acceptable method.

This technic is but one of the many methods Hahnemann is employing to combat staphylococcal infection.

Floor nurses had always carried the heaviest load in the dressing of surgical wounds at our hospital. To relieve the nurses and also insure that someone was available at all times, an experiment was decided upon utilizing specially trained practical nurses as part of a dressing team under the supervision of a professional nurse. This team would be trained by the central supply supervisor, a professional nurse, and would operate exclusively from her department.

Such a team, it was thought, would appreciably prevent cross-contamination and control staphylococcal infection cases, and would emphasize, to both doctors and nurses, the necessity for careful technic.

A program was instituted that taught participating practical nurses the proper technic for gloving and gowning and for opening prepacked and presterilized supplies and sterile instrument packs.

For three weeks, on-the-spot seminars were held, with the practical nurses making surgical dressing rounds with the residents and the central supply supervisor. In classes, the use of instruments and the proper technics for sterilizing them were taught.

Then, for another two weeks, the practical nurses were taught the technics of dressing under the close supervision of an R.N.—the central supply supervisor.

Floor nurses also participated in the final training, checking ability and sterile technic.

The wheeled carriers used are assembled by the central supply department. Sterile equipment includes caps and masks, gowns, gloves, gauze, towels, combine pads, Kling bandages, rolled bandages, Penrose drains, knife handle, and blade.

Four packs are made up for dressings. The major pack includes thumb forceps, clip remover, hemostats, two cotton balls, and two applicators. The sterile chest pack includes a Kelly and hemostats. Sterile scissors and a sterile wire-cutter are each wrapped separately.

The instruments used are all numbered, according to pack, and the practical nurse is responsible for the equipment and instruments used in her cart.

In addition to the items mentioned above, the cart also holds alcohol cotton balls, peroxide cotton balls, adhesive tape, Montgomery straps, tincture of merthiolate, forceps in 70 percent alcohol, Scotch tape, procaine, culture tubes, silver nitrate sticks, tincture of benzoin, surgical dressings, waxed paper bags, shopping bags, sterile distilled water, an irrigation set, safety pins, Vaseline gauze, and iodoform gauze.

There are three surgical floors which utilize the cart. It is used for surgical rounds at 7:30 a.m. for the ward surgical floor and is on call for the other two floors, which house chest surgery patients.

Wheeled carrier is assembled by central supply department, contains numbered instruments, dressing medications, and sterile equipment including caps and gowns.

*Central supply supervisor, Hahnemann Hospital, Philadelphia.

Dressing information has already been supplied by the doctors making 7:00 a.m. rounds. This information facilitates use of the cart.

At the start of the rounds, the doctor puts on cap, mask, gown, and two pairs of gloves. He retains the same cap and mask throughout the rounds. The practical nurse, wearing cap and mask, assists the doctor. She then gets the patient ready, sets up the screen (if necessary), lowers the bedspread and sheet, puts a face towel over the patient's nose and mouth, and places two paper bags on the bed, one for dirty dressings, the other for dirty instruments and gloves.

The instrument pack is then opened on the bed, and gauze and alcohol cotton balls are placed on the cover with the instruments.

The doctor on dressing duty then removes the dirty dressing from the patient and places it in the waxed paper bag. He then removes the outer pair of the gloves he donned previously, and places them in the second bag. He cleanses the wound area with 70 percent alcohol and dresses the wound.

The soiled instruments are wrapped in the cover and placed in the second bag with the gloves.

The doctor then removes the gown and the second pair of gloves and places these in the second bag. This bag is then put into the shopping bag and returned to the central supply department. The bag and its contents are autoclaved before the gloves and instruments are removed and washed.

The first bag, containing the dirty dressings, is placed in a special container on the floor. Immediately after the dressing rounds, this container is emptied into the floor trash chute which leads directly to the incinerator. There, the material is burned at once.

The doctor then washes his hands and proceeds to the next patient. The same technic is repeated.

The dressing carrier or cart never goes into a patient's room or near a patient's bed.

Patients in isolation are redressed using the same technic, except that the cap, gown, and mask are placed in the isolation bag within the patient's unit and disposed of by the accepted method at the close of each 8-hour tour of duty. The gloves and instruments are placed in waxed paper bags—two are used for added protection—then in a shopping bag, and returned to the central supply department for autoclaving before cleaning.

Central supply personnel do not enter the isolated patient's room. All supplies are passed in to the doctor as needed.

Hahnemann Hospital's infection-control record is good. We believe this record can be ascribed to the tightening of technic in all areas, particularly the operating room and the surgical patients' floors.

This improved surgical dressing technic is part of the redisciplining of the hospital's entire program. Although it is somewhat elaborate and time-consuming, we believe that its significance becomes apparent when one considers that, at the time of writing,* not a single case of cross-infection has been reported on any of the three surgical floors since the experiment began.

*October, 1958.

Above: Doctor changes surgical dressing on patient with practical nurse assisting him. Previously, he donned sterile cap, gown, mask, and two pairs of gloves. Practical nurse has prepared patient, placing face towel over his nose and mouth. She has also placed two waxed paper bags on bed.

Below: After removing dirty dressing, the doctor drops it into waxed paper bag. He then removes outer pair of gloves and places them in the second bag. After wound has been dressed, the instruments and the doctor's gown and second pair of gloves are also placed in the second bag. The first bag is burned; the second is returned to central supply where its contents are autoclaved and washed.

• *The following articles are taken from the current practice manual of the Peter Bent Brigham Hospital. This material, which appeared in Bulletins 7, 30 and 72* issued by the current practice committee, is reproduced here with the permission of the executive committee of the hospital.*

Portable Supply Carts Aid to Efficiency

SPLINT CARTS

PURPOSE:

To establish a routine for requisitioning, returning and maintaining a splint cart and for fixing charges for care of such equipment as needed.

RECOMMENDATIONS:

1. **Charge:** Rental charge of $10 is made for the initial application.

2. **Maintenance Responsibility:** The splint cart is the responsibility of the central supply room. The inventory on each cart is to be checked on return of the cart to the Supply Room. The items used are to be listed on the requisition and will be credited upon return of the equipment.

3. **Inventory:** The inventory to be maintained on each cart is determined by consultation with the resident in orthopedic surgery.

4. **Requisition** for the cart originates with the house officer in charge of the patient. When the Supply Room is closed (nights, Sundays and holidays), the surgical supervisor is contacted to accept the requisition and release the cart.

5. **Return of the Cart.** The cart is to be returned to the central supply room as soon as the assistant resident has explained the traction to the nurse in charge of the ward. An orderly is to be called. Under no circumstances is the cart to be left on a nursing unit.

6. **Charge slips** are forwarded to the business office by the central supply room upon return of the equipment. Items not returned are indicated and costed.

7. **Splint Carts.** Four carts are to be maintained:

a. One cart for Simmons Suspension Frame containing:

- 4 wing nuts
- 4 washers
- 6 fracture bar clamps
- 12 swivel pulleys
- 1 exercise bar
- 1 turntable telescopic fracture bar
- 1 irrigation hook
- 6 slings
- 6 spreaders
- 7 weight carriers (hooks)
- 2 hanks rope
- 4 — 5 lb. weights
- 4 — 3 lb. weights
- 8 — 1 lb. weights stockinette 3″ and 4″
- 4 Ace bandages 4″
- 4 Ace bandages 6″
- 2 pieces felt ½″ x 10″ x 48″
- 4 sponge rubber traction straps
- 2 foot plates
- 1 Posey traction spreader
- 10 ft. of 6″ strapping
- 12 spring clips
- 24 heavy safety pins in paraffin block

b. Two carts for Chick Smart Frames containing:

- 4 — 7″ traction arms
- 6 — 18″ traction arms
- 2 — 36″ traction arms
- 1 trapeze assembly
- 2 clamp blocks
- 12 pulleys
- 6 slings
- 7 spreaders
- 7 weight carriers
- 2 hanks rope
- 4 — 5 lb. weights
- 8 — 1 lb. weights
- 4 Ace bandages 4″
- 4 Ace bandages 6″ stockinette 3″ and 4″
- 2 pieces felt ½″ x 10″ 48″
- 2 sponge rubber traction straps
- 2 foot plates
- 1 Posey traction spreader
- 10 ft. of 6″ strapping
- 12 spring clips
- 24 heavy safety pins in paraffin block

*The complete *Current Practice Manual* is available at a cost of $5.00.

c. One cart for Zimmer Frame containing:

2 V brackets (200G)
12 pulleys and hanger (200H)
2 stirrups and hanger (200J)
6 double swivels (200K)
2 traction arms 36″ (640-3A)
2 traction arms 27″ (640-3B)
2 traction arms 18″ (640-3C)
2 traction arms 9″ (640-3D)
7 weight carriers
2 hanks rope
12 spring clips
4 — 5 lb. weights
4 — 3 lb. weights
8 — 1 lb. weights stockinette 3″ and 4″
4 Ace bandages 4″
4 Ace bandages 6″
2 pieces felt ½″ x 10″ x 48″
4 sponge rubber traction straps
2 foot plates
1 Posey traction spreader
10 ft. of 6″ strapping
24 heavy safety pins in paraffin block

LOCATIONS AND EQUIPMENT FOR EMERGENCY CARTS

PURPOSE:

To provide mobile emergency supplies at critical points throughout the hospital for resuscitation.

RECOMMENDATIONS:

I. Inventory for each cart is as follows, with storage areas designated. Where pertinent, catalogue numbers and company are designated.

A. TOP SHELF:

1. Two oxygen tanks with yokes (304 - 5175 - 800)
2. Oxygen apparatus:
   1 face inhaler casting (122-309-0374–800 Ohio)
   1 3-liter bag (211-2820-100 Ohio)
   2 nipples (213-2543-500 Ohio)
   1 head strap (211-1676-100)
   1 large adult mask with hooking (309-0388-600)
   1 medium adult mask (309-0387-600)
   1 tank wrench (Emerson T)
3. Kreislman resuscitator with aspirator (Model 116, 305-0016-900)
4. Fishing tackle box

a. Top shelf — drugs

No. ampuls	Drug	Concentration
2	aminophyllin inj.	0.25gm/10cc
2	calcium chloride	1.0gm/10cc
2	digoxin	0.5gm/2cc
2	ephedrine	50mgs/1cc
2	phenylephrine	4.0mgs/2cc
2	epinephrine aqueous	1.0mg/1cc
2	neostigmine methylsulfate	0.25mg/1cc
2	1-arterenol	0.1%4cc
4	seconal	500mgs/10cc
2	procaine hydrochloride	100mgs/10cc
1	succinylcholine	200mgs/10cc
	5 glass ampul files	

b. Middle shelf

2 — 10cc syringes—multifit metal tip
5 5cc syringes—multifit metal tip
4 — No. 19 gauge 2″ needles
2 — No. 16 gauge 2″ needles
4 — No. 21 gauge 2″ needles
4 — No. 20 intracardial needles

c. Base

2 tourniquets
alcohol sponges
water soluble lubricant
1 roll ½″ adhesive
1 roll 1″ adhesive
3 oropharyngeal airways, 1 medium, 2 large Guedel
3 endotracheal tubes with cuffs: 29 French, 32 French, 35 French
1 nasopharyngeal airway
1 nasotracheal tube
1 Foregger folding scope with medium Wis Foregger blade
1 Universal adaptor
1 10cc multifit metal tip syringe
1 rubber shod Kelly
1 No. 18 gauge blunt needle
1 suction catheter
1 tonsil tip metal suction
2 bite blocks
6 unsterile 3 x 3 sponges

B. DRAWER OF CART

1. Tracheostomy set containing
   1 Bard Parker handle
   1 toothed forceps
   1 operating scissors, Metzenbaum
   2 — 0 chromic catgut suture material
   1 package skin silks
   4 straight hemostats
   2 curved Kelleys
   1 tracheal spreader
   1 No. 5 tracheostomy tube
   1 No. 7 tracheostomy tube
2. 2 pairs sterile gloves, size 7½
3. 2 pairs sterile gloves, size 8
4. 2 packages 4 x 4 sponges
5. 2 packages doctors' towels
6. 2 No. 16 French whistletipped red rubber urethral catheters
7. 2 No. 14 French whistletipped red rubber urethral catheters
8. 2 plastic nasal oxygen catheters
9. 1 intravenous set

C. BOTTOM SHELF:

Gomco suction model No. 965

II. Emergency carts shall be located in the following areas:

A. Corridor of the Operating Suite for use in the Recovery Room, Cystoscopy, C, D, E, and F Main.

B. D Bridge for use on C, D, E, and F Second, Bartlett Unit, and E Third.

C. Central Supply Room for use in scheduled procedures in x-ray, and in the cardiac and respiratory laboratories.

D. A Second for use on A Main, A Second, and A Third.

E. B Pavilion for use on that ward only.

F. Emergency Department, for use in the Emergency Department, Out-Patient Department, and x-ray.

III. The entire top of each cart is covered with a transparent, heat-sealed plastic envelope that must be broken in order to secure supplies and equipment contained within.

IV. Carts will be stocked by personnel of central supply room (oxygen therapist) with a daily check of equipment and a monthly replacement of batteries. The charge nurse is to notify the central supply room when a cart has been used in her department so that immediate replacement of supplies can be accomplished.

V. The oxygen therapist is responsible for making out charges incurred from use of the cart. Charges are as follows:

Private – $20

Semi-private – $17

Ward – $15.

Dressing Kit Technic

PURPOSE: To establish standard kits for care of dressings.

RECOMMENDATIONS:

1. **Dressing kits** are to be made up in the Central Supply Room.

2. **Standard kits** are to be supplied on the dressing cart as follows:

a. Suture removal kit

1 siliconated surgical blade

1 dressing forceps, smooth, 4″ stainless steel

2 – 4 x 4 gauze pads

(This kit is packaged in a 13″ x 13″ brown Steriwrap. Sterilize 30 minutes at 205 F.)

b. Wound treatment kit

1 hemostat 6½″ curved Kelley, stainless steel

1 dressing forceps, smooth, 4″ stainless steel

1 scissors, stainless steel

4 – 4″ x 4″ gauze pads

1 ABD 8″ x 8″ pad

(This kit is packaged in an aluminum tray and sterilizing envelope. Sterilize 30 minutes at 250 F.)

c. Profuse drainage pack –

STERILE

The bag of a J-D pack by Johnson & Johnson is opened for sterilization by exposure to saturated steam at 250 F. for 30 minutes. On removal from the sterilizer, fold the edges of the bag and seal with pressure sensitive tape. Stamp "sterile" on the face of the pack.

d. Colostomy pack–Unsterile

J-D pack by Johnson & Johnson. Label "colostomy pack, unsterile," in such a way as to hide the original label.

3. **Technic:** Dressings are to be done with a "no touch" technic. The soiled expendable dressings are disposed of in a waterproof paper bag which is left on the bedside table. The instruments, both used and clean, are to be dropped into the instrument safe on the dressing cart by the individual doing the dressing. Textiles are dropped into the laundry hamper on the dressing cart.

4. **Disposal of Used Supplies:**

Paper bags with soiled dressings:

Bags are to be collected by a ward attendant. Each one is to be crushed between the flat of the hands in the attempt to identify instruments that may have been accidentally discarded with the soiled dressings. The bags that contain only soft material are then dropped into the waste can for incineration. Any bags containing hard objects are sent to the central supply room for inspection.

Laundry hamper:

The hamper is placed in the top of a ward hamper for transport to the laundry.

Boston's Busiest...

Peter Bent Brigham's Central Supply Services Operating Rooms, Wards, Research Areas, Physicians' Offices

The central supply room at the Peter Bent Brigham Hospital, in Boston, is generally rated as the busiest in the city. Out of it comes, every day, the enormous amount of supplies needed not only by the Peter Bent Brigham Hospital, but by other medical organizations as well.

"Everything within these walls that must be cleaned and sterilized," said Janet Armitage, R.N., who has charge of central supply, "goes through this room. We supply not only our own ward areas, operating rooms, research areas and physicians' offices, but also all the solutions for the surgical research laboratory at the Harvard Medical School, and we do some autoclaving for the Harvard School of Public Health.

"The number of items we stock runs into the hundreds, and we do use a large number of disposable items which have proven themselves in service. The greater part of our stock is solutions, and we are probably one of the very few hospitals that still manufacture their own.

"Before 1948, when this room was opened, central supply operated in another part of the hospital. Although it was adequate in supplying the needs of the doctors and patients, it was also wasteful and disorganized due to the pressures of a very heavy patient load. Central supply is, as most hospitals have come to realize, a business in itself, and the administration made it their business to see that it came to be operated as such at this hospital."

The room itself, noted for the efficiency of its work flow and in-and-out movement of supplies, was designed by Dr. Carl W. Walter. The system of records and charges was the result of meticulous, searching study by a cost analyst and the hospital's accounting department.

"The consultant spent a full year here, part-time of course," continued Miss Armitage, "going into every single item used in central supply. He made it his concern to find out how much it cost, how long it lasted, and what happened to it all along the line. He went into the various

Janet Armitage, left, head of central supply, is shown with a dressing cart designed by Dr. Carl W. Walter. The cart contains everything needed to perform any type of surgical dressing, and each is returned to central supply twice daily for a complete washing and restocking. The carts are currently stationed only in the surgical areas, since the greater part of the work is of that nature, but the hospital hopes to extend their use to other areas in the future.

There is one delivery of supplies throughout the hospital once a day, every day of the week. The central supply orderly at the right has just returned from the floor with his baskets loaded with soiled equipment and supplies. He will check their contents against the original requisition to note and record any missing articles.

departments to learn how much the material itself cost and the labor cost.

"It was a most revealing study, and the system devised as a result of it is the basis of our present ability to operate efficiently and economically.

"In the old days, before adequate records were kept, central supply was sometimes hard put to replenish supplies.

"To select an item at random: this department might have shown, in a given month, a requisition order for scissors out of proportion to its normal demand. Since no one knew why so many new scissors were needed, it was difficult to justify our demands on the administrative budget. Now, by our checking method, we can spot at once where the loss occurred, and the ward or area responsible is charged for it, the cost being transferred out of the central supply budget. This method enables us to get our replacements promptly and without question. And you may be sure," she added, "that it has cut down on loss and breakage to a very marked degree."

To assist her in the operation of central supply, Miss Armitage (who is a dyed-in-the-wool Peter Bent Brigham alumna, having gotten her cap from the hospital's school of nursing, done general duty, served as head nurse on the pavilions for seven years and at the blood bank for three years before taking over her present duties in 1950) has a staff of 20 employees. Thirteen work the 7 a.m. to 3 p.m. shift; five work the 3:30 to midnight shift; and two are on nights from 11 p.m. to 7 a.m.

There is one delivery of supplies throughout the hospital every day of the week. It is the responsibility of the head nurse to make out her requisitions, which are picked up by the central supply orderly. Every requisition must bear the code number of the department or area requesting the supplies.

Seventy-five per cent of the supplies are requested by the operating rooms. Wards come next in point of demand, and the research areas last. The orders for each area are placed in baskets and delivered.

When the soiled supplies and equipment are picked up and returned to central supply by the night shift, the orderly checks the contents of the baskets against the original requisition sheet, and fills out a credit memo (Figure 1). Any articles missing, unless they are in the category of supplies paid for by the patient, are charged against the ward.

"If catheterization sets are missing, for instance," said Miss Armitage, "the ward is charged by a cost transfer."

To keep track not only of supplies used by each department, but to handle charges to patients versus those to wards and other areas, Miss Armitage keeps a monthly summary sheet (Figure 2). An asterisk (*) indicates items for which patients are billed direct; those not so marked are the responsibility of the ward, and the latter is so charged, as in the case of the catheterization sets mentioned.

A monthly summary (Figure 3) is also kept of credits and debits for each ward, to enable Miss Armitage to fill out her own monthly requisition for new supplies.

To further facilitate services and charges to physicians and patients, central supply uses three additional forms.

The first form is the private ambulatory requisition and charge, (Figure 4), which is made out by the physician. If he wants the materials he requests to be autoclaved after use, he makes a notation to that effect, and the service is handled by central supply.

The first form is in triplicate: Miss Armitage keeps the original; the second (yellow one) is clipped to a charge sheet bearing the physician's name. The third copy is the physician's record. Miss Armitage prices the items each morning, and sends the listings to the accounting office.

The second form is the charge requisition (Figure 5). After this requisition is filled, it, too, is clipped to the yellow sheets already accumulating to the doctor's account.

The third form is the credit slip (Figure 6) for unused items, which are then credited to the doctor or the patient. Doctors are billed once a month.

Chief therapist Edith Neimant, right, is shown with one of the emergency resuscitation carts, eight of which are stationed in various areas of the hospital for almost immediate availability. All materials needed for such emergencies are packed in the cart by central supply, and covered tightly with polyethylene. If the polyethylene is not broken within a month, the cart is returned to central supply, where it is inspected by Mrs. Neimant, and needed replacements made before it is returned to service.

James Murray, M.D., assistant to Dr. Walter, is shown on the left with the oversize mattress autoclave — one of the first of its kind installed in the country, and still one of the largest in use in the New England area. The gas sterilizer handles all the equipment used in open-heart surgery, as well as equipment used for infectious and terminal cases. "Into it go pillows and mattresses," said Miss Armitage, "and we have even taken beds apart and put them in, too."

PETER BENT BRIGHAM HOSPITAL

CENTRAL SUPPLY ROOM CREDIT MEMO

RETURNED BY
COST CENTER:
NAME _____
CODE _____ PREPARED BY. _____ DATE. _____

NO. ITEMS	NAME OF ITEM RET'D.	ITEMS PER UNIT	CREDIT VALUE	LIST OF MISSING REUSABLE EQUIPMENT	COST OF MISSING ITEM	NET CREDIT
	75cc flask					
	100cc flask					
	500cc flask					
	1000cc flask					
	2000cc flask					
	steri-mix bushing					
	steri-pour bushing					
	stoppers 75cc flask					
	precaine bottles					
	precaine caps					
	2cc syringes					
	5cc syringes					
	20cc syringes					
	large basins					
	small basins					
	emesis basins					
	sterilization trays					
	gloves					
	needles					
	wound treatment kit					
	cath.					
	catherization					
	venous cannulization					
	TOTAL			TOTAL		

Figure 1. The credit memo reproduced above is used by the central supply orderly to check off used equipment returned by the various areas, and to enter missing reusable material, together with their itemized costs. Missing items are charged against area responsible, and cost is transferred to CSR budget.

MONTHLY SUMMARY REQUISITIONS

Sheet No. 1

Cost Center Code _____ ISSUED BY CENTRAL SUPPLY ROOM

Cost Center Name _____ PETER BENT BRIGHAM HOSPITAL Month of _____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Totals	Unit Cost	Extension
SETS																																		
Bandages No. 1																																		
Bandages No. 2																																		
*Cannulas, Veins																																		
Chest Drainage																																		
Chest Drainage Flask																																		
Catheterization, Female																																		
Cloth																																		
Constant Drip																																		
Cystotomy Drainage Bottle*																																		
I. V.																																		
Lumbar Puncture																																		
Medicine																																		
Midwifery																																		
Pneumothorax																																		
Pneumothorax																																		
Suture Removal																																		
Thoracentesis																																		
Thoracentesis Flask																																		
Thoracentesis Diagnostic																																		
Ureteral Drainage																																		
*Venous Intubation #14																																		
Pediatric Tubing #14																																		
*Venous Intubation #18																																		
Pediatric Tubing #18																																		
Venous Pressure																																		
Ventricular Drainage																																		
3 ft. Wrapperless																																		
3 ft. Wrapperless																																		
Wound Treatment Kit																																		
Ventricular Drainage Set																																		
Linen Request																																		
NEEDLES																																		
No. 14																																		
No. 16																																		
No. 17																																		
No. 18																																		
No. 19																																		
No. 20																																		
No. 21																																		
No. 22																																		
No. 23																																		
No. 23 Huber																																		
Intracardial																																		
Lumbar Puncture																																		
Vaculyte Tip																																		
No. 25 Ga* Disposable																																		
CATHETERS																																		
Rubber Mask																																		
*Hand Oxygen Catheter																																		
Oxygen Gauge																																		
Oxygen Tent																																		
Positive Pressure Mask																																		
Tent Canopy																																		
Disposable Oxygen Mask																																		

Figure 2, above, a monthly summary requisition sheet, indicates by an asterisk (*) items for which patients are charged. All others are the responsibility of the ward.

To one side of the central supply room is an oversize mattress autoclave.

"This is a gas sterilizer," Miss Armitage said. "We have used steam, but find the gas method of sterilization more satisfactory. Into this autoclave goes equipment used by infectious or terminal cases, as well as all the equipment used in our open-heart surgery.

"Open-heart surgery is performed about twice a week, so the autoclavé is routinely in service for this work. We have an affection for this old autoclave. It's one of the first of its kind installed in the country, and I believe it is still one of the largest in use in this part of the country. Into it go pillows and mattresses; we have even taken beds apart, and put them in, too.

"The piece of equipment that we are probably most proud of," continued Miss Armitage, "is the dressing cart designed by Dr. Walter and the surgical and nursing staff. At present, these are stationed only on the surgical services, since the greater part of the work at the hospital is of that nature. They are expensive, so we put them where they are most urgently needed, but we hope to have them in other areas in the future."

The cart contains everything needed to perform any type of surgical dressing, from removing sutures to doing a profuse drainage dressing. Each cart is brought down to central supply twice daily. All equipment is removed, the cart is washed down, restocked, and sent back into service.

Also operating out of central supply is the oxygen therapy department, headed by Edith Neimant. As chief therapist, Mrs. Neimant is called upon to set up oxygen tents, put patients on respiratory assistors, and answer doc-

Figure 3, below, is the monthly summary form used to credit wards and areas with equipment returned in good condition, and to charge them for missing articles.

CENTRAL SUPPLY ROOM CREDIT MEMORANDUMS - MONTHLY SUMMARY

RETURNED BY
COST CENTER:
NAME
CODE _____ PREPARED BY _____ Month of _____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Totals	Unit Cost	Extension
7lbs flask																																		
100cc flask																																		
500cc flask																																		
1000cc flask																																		
med. mix basking																																		
med-pour basking																																		
stoppers 7lbs flask																																		
pressure basins																																		
injection caps																																		
1cc syringes																																		
5cc syringes																																		
20cc syringes																																		
large basins																																		
small basins																																		
emesis basins																																		
sterilization trays																																		
gloves																																		
needles																																		
wound treatment kit																																		
sink																																		
catheterization																																		
venous cannulization																																		

CENTRAL SUPPLY ROOM - MISSING REUSABLE EQUIPMENT - MONTHLY SUMMARY

PREPARED BY _____ Month of _____

Unit of Issue	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Totals	Unit Cost	Extension

Peter Bent Brigham Hospital
721 HUNTINGTON AVENUE
BOSTON, MASSACHUSETTS

PRIVATE AMBULATORY PATIENT
REQUISITION AND CHARGE

No. 37126

Charge to _____

Address _____ Date: _____

Patient _____ Doctor _____

Service Requested: Results

FORM 300-1028 5-60

This Copy To Be Returned to Physician by Service Department

The three forms reproduced on this page are used to facilitate charges and services to physicians and patients. Figure 4, above, is made out by the physician in triplicate. Should he want the equipment requested autoclaved after use, he makes a note to that effect, and central supply handles the service. The original of the form is retained by Miss Armitage who prices the requisitioned equipment and services each morning, and sends the form to the accounting office. The second sheet is clipped to the physician's charge sheet. The third copy is retained by the physician for his own records. The accumulated slips clipped to the physician's charge sheet are totalled for billing once a month.

tors' questions. The service is formally covered 40 hours a week, Monday through Saturday noon, but Mrs. Neimant is on call each weekend.

In connection with its service, and set up by central supply, are the resuscitation emergency carts. There are eight of these carts stationed in different areas, so that precious time is not lost in obtaining the life-saving equipment.

All material needed to handle such emergencies is packed in the cart, which is tightly covered with cellophane. The date of its assembly is noted, and if the cellophane has not been broken within a month, the cart is returned to central supply, where Mrs. Neimant opens it here for a thorough inspection.

She checks the medications for any change in color which might indicate loss of potency, and changes all the batteries in the laryngoscopes, before authorizing the return of the cart into service.

"We are, of course," concluded Miss Armitage, "prejudiced in favor of the central supply system used here at Peter Bent Brigham Hospital, because we know it works to the benefit of the patient and the staff. The responsibilities of administration, including the accounting office, the medical, nursing and research personnel, and central supply, dovetail neatly to make a closely knit over-all operation. It is the type of operation, with perhaps some slight modifications, that could work effectively, we believe, in any size hospital."

NO SERVICE PERFORMED WITHOUT PROPERLY FILLED OUT CHARGE REQUISITION

USE ADDRESSOGRAPH PLATE OR PRINT

PATIENT'S NAME

NUMBER

AREA & FLOOR

DATE

Charge Requisition

CHECK (√) SERVICE AREA NAME AND CODE NUMBER

☐ PHARMACY 207	☐ PHYSICAL THERAPY 238
☐ X-RAY 250	☐ TELEPHONE 270
☐ EKG 235	OTHER AREA CODE

IN PATIENT (√ ONE)	OUT PATIENT (√ ONE)
☐ PRIVATE	☐ CLINIC
☐ SEMI-PRIVATE	☐ EMERGENCY WARD
☐ WARD PRIVATE	☐ PRIVATE AMBULATORY
☐ WARD	

REQUEST FOR: (PRINT)	CODE	UNITS	CHARGE
		TOTAL UNITS	TOTAL CHARGE

PETER BENT BRIGHAM HOSPITAL

Figure 5, above, is the charge requisition. After the equipment or services requested have been handled, this slip is clipped to physician's charge sheet.

Figure 6, below, is the form used to list unused items or services, which are credited to the patient or doctor concerned, and deducted from the total bill.

PRINT SERVICE AREA NAME AND CODE NUMBER

F-204

PETER BENT BRIGHAM HOSPITAL

PRINT PATIENT'S FULL NAME & ADMITTING NO.

STREET

CITY STATE

DATE

IN PATIENT (√ ONE)	OUT PATIENT (√ ONE)
☐ PRIVATE	☐ CLINIC
☐ SEMI-PRIVATE	☐ EMERGENCY WARD
☐ WARD PRIVATE	☐ PRIVATE AMBULATORY
☐ WARD	

No Credit Allowed Without Writing Procedure And Code Number

CREDIT PATIENT FOR FOLLOWING PROCEDURES:	CODES	UNIT	CREDIT
		TOTAL UNIT	TOTAL CREDIT

CREDIT REQUESTED BY: (PRINT NAME)

CREDIT

Emory Bowen, inhalation therapist, points out features of department's latest model positive-pressure machine to Miss Yamasaki. Before he came, she was responsible for setting up and maintaining this equipment. Inhalation therapy service is still in her department, but eventually a separate department will be established.

This CSR Reports to the Administration

Central supply at Hinsdale (Ill.) Sanitarium and Hospital is no longer a nursing department, responsible to the director of nursing service. For about a year supervisor Mary Yamasaki, R.N., has been reporting directly to the hospital administrator or his assistant.

This organizational pattern, while not unique, is still uncommon in U. S. hospitals and in itself is probably the most unusual feature of the operation of the department in this hospital.

The arrangement has in no way disturbed Miss Yamasaki's excellent working relationship with nursing service. The hospital is small enough (193 beds) and her rapport with nurses on the floors is good enough that she feels free to go up to talk with them any time she has a problem or a new idea to present. About once a month she attends a formal meeting with nursing heads, and as a member of the faculty of the school of nursing, she also meets periodically with that group.

There are several other features

Volunteers at work folding linens. L. to r.: Mrs. Dorothy Jensen, Mrs Helen Hopwood, and Mrs. Helen Dunkle.

in this department's operation which make it different from many departments of its kind:

(1) The department acts as a retail outlet for some items—patients' gowns, for example, or various solutions, or prepackaged dressings. Crutches are rented through central supply. Purchasers pay cash in the department for these items, and the money collected is turned over to the business office.

Mark-up for items sold at retail may be determined by consultation with the pharmacist, or sometimes a company representative may suggest what the retail price should be.

Hinsdale Hospital, as Miss Yamasaki pointed out, is a community hospital, and making these items available for purchase is a part of its service to the community.

(2) Volunteers are effectively used to supplement the paid staff in the department. Many central supply departments shy away from the use of volunteers, arguing that they can't be depended upon. Miss Yamasaki's experience has been exactly the opposite. Her volunteers are so reliable and conscientious that they may come to work in severe winter weather when the department's employees don't come in.

Some of these volunteers have been working in the department longer than Miss Yamasaki has. They perform many duties – folding linens, making oral hygiene sticks and string sponges for tonsillectomies, wrapping syringes, and making up and wrapping trays, to name a few.

One or two volunteers are on duty every day – mostly from 9-12 in the morning. In total number of hours contributed a week in the department, the volunteers are almost the equivalent of one full-time person.

Certain volunteers work regularly in the department; others may come down from floor duty if their work there is completed and they are needed in central supply. They must put in a certain number of hours a year to remain as volunteers.

The department staff is also supplemented during the summer vacation months by high-school students who work full-time. Though this group in the past has included girls, this summer there are three boys – one of whom is back for the fifth year. The boys carry and set up orthopedic equipment, carry heavy bottles and do any other heavy lifting, replenish standard floor stocks, and perform other work which might generally be classified as an orderly's duties.

In many ways the alert and cheerful Miss Yamasaki, a graduate of the school of nursing at her hospital, is typical of modern central supply supervisors. She is interested in trying any new methods or products which may help her to operate her department more efficiently; she is one of two nurses in the department (there is also one practical nurse among the other 11 full-time workers this summer); she believes strongly that a nurse should head central supply because "sometimes when problems arise a professional understanding is required."

And, like many another CSR supervisor, she "fell into the field" – when she agreed to do the job on a temporary basis. That was some seven years ago.

Indicative of her receptive attitude toward new ideas is her comment about the department's use of disposables. "We try almost everything that comes along," she said. So far the hospital has not adopted disposable gloves, because the staff is not satisfied with the packaging. But it has been using a disposable syringe unit for some time, and everyone seems pleased with it.

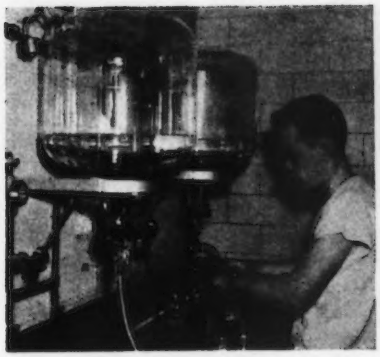
"The elimination of griping alone makes the use of disposable syringes worthwhile," said Miss Yamasaki happily. "I don't have to spend a lot of time on the phone listening to complaints about dull needles."

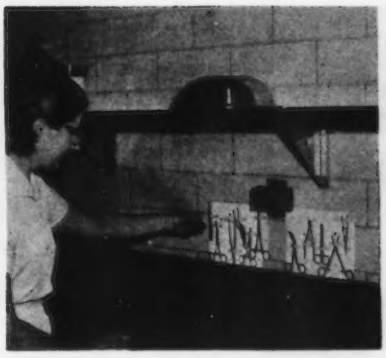
And of course, she continued, it's gratifying to know that much discomfort to the patient has been eliminated.

"But, in addition, we have done cost analyses and have found that we are saving money."

She mentioned, for example, that the medical-surgical floor's charges for syringes have gone down about $400 a month. Breakage has been

Myrtle Brodine, L.P.N., assistant supervisor, with Don Harrigan, packaging gloves in the glove room, adjacent to central supply storeroom. Approximately 150-200 pairs a day are processed. During busy seasons the figure may be as high as 250.





Left: Mickey Berthelsen fills flask from distilled-water tank. Tanks are located in sterile area, and steam from the stills was causing an undesirable amount of moisture. To solve this problem, the stills (just behind the wall on which storage tanks are mounted) were turned around. Mickey, who just finished high school, has been working in the department every summer for five years.

Center: Emma Remmers with cards she devised to show instruments most commonly used on trays. These are labeled to aid volunteers and employees in assembling trays. Contents of trays are listed on procedure cards. Instruments include scalpel handle, Kelly, eye scissors, dressing forceps, bayonet forceps, straight and curved mosquito forceps, and clip remover.

Right: Mrs. Julia Meade picks up requisition which has just come down the mail chute at top of picture. Linoleum slide was devised to guide slips into the wire basket. When the hospital is enlarged, it is expected that a pneumatic tube system will be installed.

reduced by use of the plastic syringes.

"Nurses are sometimes reluctant to try new things," the supervisor said. "When the disposable syringes first came out, they said they didn't want those plastic syringes. Now they say they don't want glass syringes. Of course we keep some glass syringes on hand – for special pediatric or psychiatric use, for example."

Like many other central supply supervisors, Miss Yamasaki has the responsibility for storing and issuing orthopedic and inhalation therapy equipment. With the recent addition of an inhalation therapist to the staff, she has been relieved of the duty of setting up and maintaining this equipment, although it still comes out of her department. She is looking forward to the establishment of a separate inhalation therapy department.

This equipment and the orthopedic equipment are kept in a storeroom next to the main central supply workroom.

Like other supervisors, too, Miss Yamasaki has a good deal to say about purchasing of supplies for her department. When a proposed purchase involves a major expenditure, she talks it over with the purchasing agent, who in turn discusses it with the administrator.

The hospital has a well-organized civil defense program, and drills are held periodically to rehearse the staff members in their roles in event of disaster. Posted in the central supply department for immediate reference are the phone numbers of Miss Yamasaki and several key personnel in her department, as well as lists of supplies needed in various areas if disaster strikes.

Sample requisition covering supply items from A-S. There is a second form for items from S-Z, and there are separate forms for orthopedic equipment, intravenous solutions, inhalation therapy equipment, and miscellaneous items or services.

HINSDALE SANITARIUM & HOSPITAL — CENTRAL SUPPLY A-S

PRESS FIRMLY
PRINT WITH BALL POINT PEN OR PENCIL
ALL COPIES MUST BE LEGIBLE

Qty.	Item	Charge
	APPLICATORS 3"	
	APPLICATORS 6"	
	ASEPTO SYRINGE	
	ARM BOARDS	
	BANDAGE—ELASTIC	
	BANDAGE—GAUZE	
	BOWLS	
	COTTON BALLS—CAN	
	CULTURE TUBE	
	DRESSINGS ABD PADS	
	ADAPTIC	
	EYE PADS	
	FLUFFS	
	KERLIX	
	PER PADS	
	TELFA	
	GAUZE SPONGE—4 x 4 Can	
	GAUZE SPONGE—4 x 8 Can	

Qty.	Item	Charge
	GLOVES—6½	
	GLOVES—7	
	GLOVES—7½	
	GLOVES—8	
	GLOVES—SPECIAL	
	JAR & FORCEPS	
	MANOMETER—WATER	
	MEDICINE GLASS—STERILE	
	NEEDLES 25—⅝	
	22—1	
	20—1	
	22—1½	
	20—1½	
	20—1½	
	18—1½	
	ST. BORIC 1000	
	ST. DIST. WATER 1000	
	DIST. WATER 1 Gal.	

Qty.	Item	Charge
	NACL 1000	
	NACL IRRG 1000	
	ZEPHIRAN 1:10,000	
	SHROUD	
	STEAM INHALATOR	
	STERILE URINE BOTTLE	
	SPUTUM BOTTLE	

REQUESTED BY — CHARGE
CHARGED BY
DATE CHARGED

FLOOR COPY

DEPARTMENT — 5 — CENTRAL SUPPLY A-S

Trays infrequently used are covered with plastic to protect them from dust and thus preserve sterility during a long period of shelf storage.

The busy hospital is planning an addition of 150 beds. The new unit will include more space for central supply, part of which will be occupied by an office for the supervisor.

Storage space, at present, is probably the department's major problem – one which the increasing use of disposables does not solve, because the disposable items still require space before use.

Turnover of personnel in the department is low. Perhaps one reason for this is that Hinsdale is primarily a residential community, and the transient workers found in many big-city central supply departments are not likely to seek employment there.

However, the pleasant working environment is undoubtedly an important factor in keeping the employees on the job. Miss Yamasaki obviously has a good relationship with her employees, and speaks in highly complimentary terms about the rest of the hospital staff, from the administrator on down.

At present the department is open 16 hours a day. The other R.N. (besides Miss Yamasaki) is in charge of the 3-11 shift. Eventually 24-hour coverage will be provided. Now, however, most needs during the 11-7 shift can be filled from the standard floor stocks which are replenished regularly during the day.

Supplies are transported up and down by dumb waiter. Requisitions are sent down by mail chute (see picture). Installation of a pneumatic tube system is planned when the hospital is enlarged.

The bugaboo of many central supply departments, judging by discussions at conventions, seems to be loss of instruments from trays. Such loss is at a minimum in Miss Yamasaki's department. Every instrument has a number. Every tray is checked when it is returned to the department. If an instrument is missing, the floor is called right away. Usually the instrument is found. In many instances it had been taken into the utility room for washing.

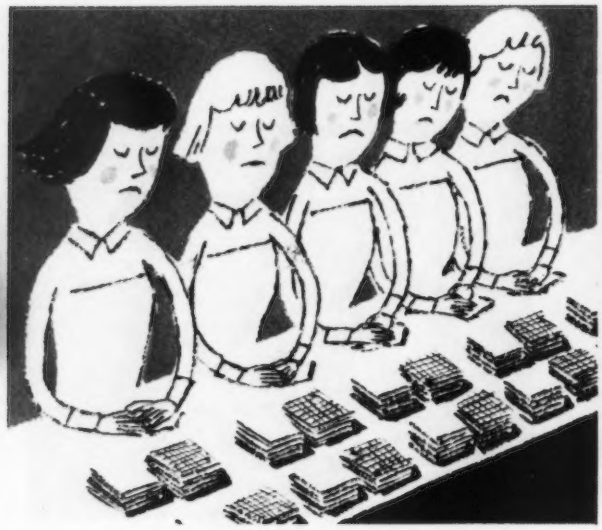
Both professional nursing students and students in practical nursing spend some time in the department. The practical nurses come every day for a week; the professional nursing students come in once or twice. All students say they appreciate the experience, because it makes them think about the use of supplies. They find out how much work is involved in their preparation, and how much waste there is, and thus realize the importance of avoiding waste.

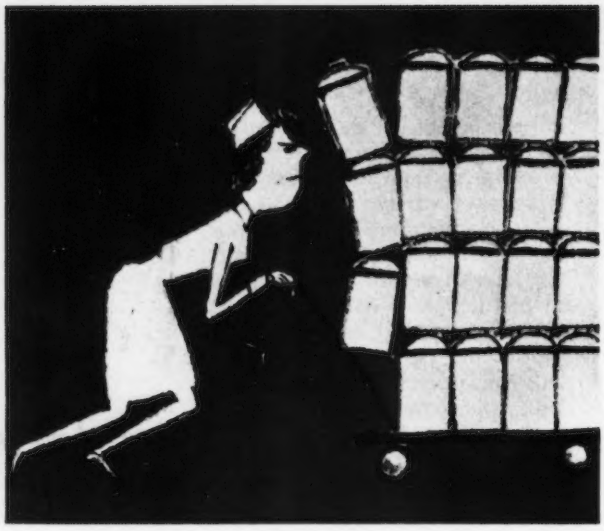
Miss Yamasaki, like other up-to-date supervisors, welcomes every opportunity to exchange ideas with others in her field and to visit other departments. She praised the astuteness of administrators who, like hers, send their supervisors to conventions and other meetings.

Not only do the supervisors come back with new ideas, she pointed out, they also learn that their problems are not unique – and they may return, in fact, feeling quite optimistic over their own situations.

Index

administration
central supply reports 85
autoclaving
reautoclaving sterile packs 15
surgical scissors 15
Peter Bent Brigham Hospital 80
carts, floor 12
emergency 78
fracture 30
portable 77
cleansers
for stainless steel 57
cross-infection 17, 25
cystoscopy instruments 31
disposables 67
syringe units 70
dressing kit technics 79
ethylene oxide
sterilizer 14
fracture equipment 28
gloves
costs 68
sterilization 16
washing, wrapping 18
Hahnemann Hospital
combating staph 75
Hinsdale Sanitarium and Hospital 85
Indianapolis General Hospital 59
infection
cross-infection 17, 25
staphylococcus 16, 75
intravenous solutions
safety 17
laundries 18
linen
folding 17
nurses
head of CSR 36
role in CSR function 9
organization
of central service 44, 63
orthopedics
department 53
oxygen
department 53
packaging
gloves and surgical packs 18
personnel
of CSR and OR 16
pharmacists
head of CSR 15, 37
planning of department 40
plastics 16, 49, 51, 52
set-up trays 22
siphon
for gastric drainage 58
splints
carts for 77
charge slip 54
stainless steel
care of 56
staphylococcus infection 16, 75
sterile packs
reautoclaving 15
sterilization
cold 15
of cystoscopy instruments 31
of urological instruments 16
sterilizers
ethylene oxide 14
stomach
drainage, syphon for 58
storage
of fracture equipment 28, 55
streamlined setup 59
supervisor 9
qualifications 38, 39
surgical dressing technic 75
surgical packs
washing, wrapping 18
surgical scissors
autoclaving 15
syringes
disposable 70
dispensing 16
terminal care
of rooms 16
thermo-plastics 49
trash
problems 41
trays
set-up 22
urology
instruments, sterilization 16
work flow 24





Don't waste time with rolling your own dressings . . . . . packing each one into cans for sterilization . . . . . :

Now—sterile abdominal pad in S-E Pack...for complete sterility all the way to the wound

(A LOW-COST, COMMON-SENSE DEFENSE AGAINST STAPH INFECTIONS)

In one simple motion Curity S-E Pack opens (without scissors or string) and applies a totally aseptic pad to the patient—never touching torn, unsterile edges.

The S-E Pack is a significant advance in aseptic dressing technique. And now it's available in an abdominal pad.

The new S-E Pack offers the ultimate in ease of application. It enables you to deliver a totally sterile dressing to the wound—without fumbling, dropping or contaminating the pad with fingers or pack edges.

Another distinct benefit of the S-E Pack is its economy. A saving of time and action, plus fewer dressings. You can use one pack instead of a stack.

1. Simply peel back one flap and dressing is ready to apply.

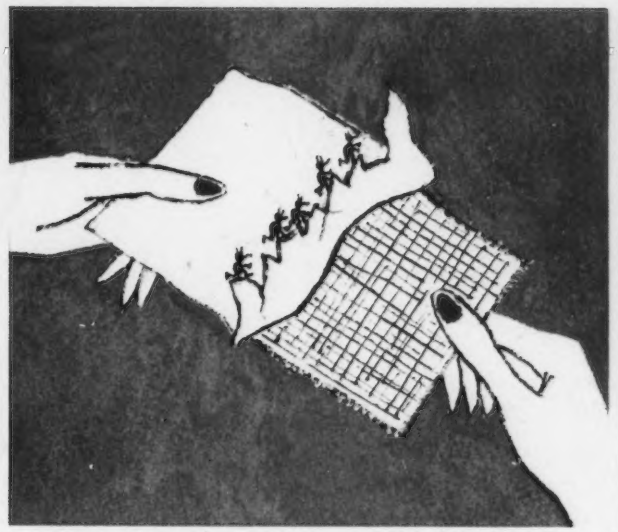
2. Dressing is tucked in pocket . . . easy to reach with one hand.

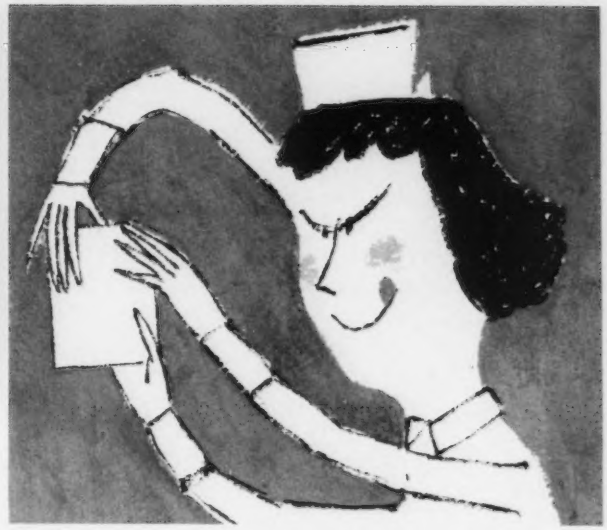
3. Other hand is free to apply sterile dressing to the wound.

Sterile abdominal pads come in three sizes: 9″ x 5″—7½″ x 8″—10″ x 8″. Cover sponges and gauze sponges are also available in S-E Pack, in a variety of sizes. Call your Curity representative for complete details about the improved asepsis and outstanding economy of **S-E Pack.**

Curity®

THE KENDALL COMPANY
BAUER & BLACK DIVISION





. . . . . prepacks that contaminate dressings when removed . . . . . or ones that take 3 hands to open

New S-E* Pack quickly delivers a sterile dressing right to the wound.

*T.M.